Open Access

# SUPPLEMENTARY MATERIAL

**Table 1. Mass Spectrometric Investigations for the Study of Gaseous Metallic and Intermetallic Species**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|
| Li | 540-830 | Li, $Li_2$, $Li_3$, $Li_4$ | [1]/1990 |
| Li | 627-893 | Li, $Li_2$ | [2]/2001, [3]/2001 |
| K | 350-460 | K, $K_2$, $K_3$ | [1]/1990 |
| Si | 1647-1917 | Si, $Si_6$ | [4]/1996 |
| Si | 1685-? | Si, $Si_2$ | [5]/1999 |
| Si | 1763-1993 | Si, $Si_7$, $Si_8$ | [6]/2001 |
| Ni | 1270-1896 | Ni | [7]/2002 |
| Ge | 1351-1744 | Ge, $Ge_2$ | [8]/2002 |
| Ge | 1351-2010 | Ge, $Ge_3$, $Ge_4$ | [9]/2000 |
| Ge | 1477-1719 | Ge, $Ge_5$, $Ge_6$, $Ge_7$, $Ge_8$ | [10]/2000 |
| Ag | 1121-1603 | Ag, $Ag_2$ | [11]/1993 |
| Sn, Sn + Au | 1421-1855 | Sn, $Sn_4$, $Sn_5$, $Sn_6$, $Sn_7$ | [12]/2000 |
| Tm | 821-1080 | Tm | [13]/1990 |
| Yb | 669-782 | Yb | [13]/1990 |
| Si + BN | 2052-2146 | B, $Si_2N$, $B_2N$, Si | [14]/2000 |
| Na + Te | 900-1200 | Te, $Te_2$, NaTe, $NaTe_2$, $Na_2Te$, $Na_2Te_2$ | [15]/1992 |
| Mg + Au + Pd | 1870-2333 | Au, Mg, AuMg, $Au_2$ | [16]/2003 |
| Ga-In | 1446-1642 | Ga, $Ga_2$, In, $In_2$, GaIn | [17]/1998 |
| $Cs_2Sb_3$, CsSb, $Cs_3Sb$ | 785-818 | Cs, $Sb_2$, $Sb_4$, $Cs_2Sb$, $CsSb_2$, $Cs_2Sb_2$, $Cs_2Sb_4$, $Cs_6Sb_4$ | [18]/1992 |
| CsSb + Te | 900-1200 | Te, $Te_2$, CsTe, $CsTe_2$, $Cs_2Te$, $Cs_2Te_2$, $Cs_2Te_3$ | [15]/1992 |
| M + $MTe_x$, M = Fe, Ni, Cr, Mo | 820-1467 | Te, $Te_2$ | [19]/1994 |
| 0.92Pd + 0.08 Pb | 1935 | Pd, Pb, PdPb | [20]/2000 |
| 0.5Pd + 0.5Sn | 2025 | Pd, Sn, PdSn | [20]/2000 |
| Ag + $Ag_2Te$ | 1073-1319 | Te, $Te_2$, Ag, $Ag_2$, AgTe, $Ag_2Te$ | [21]/1996 |
| Au + In | | Au, In, $Au_2$, AuIn, $Au_2In$, $AuIn_2$ | [22]/1990 |
| Au + Pb | | Au, Pb, $Pb_2$, AuPb | [22]/1990 |
| Ge + Sn + Si | 1704-1788 | Ge, Sn, $Ge_2$, $Sn_2$, GeSn, $Ge_2Sn$, $GeSn_2$, $Ge_3Sn$, $Ge_4Sn$, SnC | [23]/1998 |
| 0.5Sn + 0.5Bi | 884-984 | Bi, $Bi_2$, SnBi, $SnBi_2$, $SnBi_3$ | [24]/2002, [25]/2003, [26]/2003 |
| Ce + Rh + Ru + Os + C | 2533-2838 | C, Os, OsC, $OsC_2$ | [27]/2001 |
| Sc, La, Ce | Sc 1373-1573<br>La, Ce 1473-1573 | Sc, La, Ce | [28]/2009 |
| Pb + Sn (double oven technique) | 1426-1705 | Sn, Pb, $Sn_2$, $Pb_2$, SnPb (bond energies calculated) | [29]/2005 |
| $PuCd_2$+$PuCd_4$,<br>$PuCd_4$+$PuCd_6$ | 525-641<br>490-602 | Cd | [31]/2006 |

**Table 2. Mass Spectrometric Investigations for the Determination of Thermodynamic Properties of Solid or Liquid Alloys and their Vaporisation. (Solid Compounds Present in the given Concentration Range are Underlined if the Thermodynamic Functions of Formation were Determined)**

| Sample in the Effusion Cell | State of Condensed Phase | Solid Compounds | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|---|---|
| xLi + (1-x)Al, 0.017 < x < 0.298 | s | fcc | 665-918 | Li | [32]/2002 |
| 0.25Li + 0.75Sn | l | | 800-1200 | Li, SnLi | [33]/2002 |
| xMg + (1-x)Cu, x = 0.1-0.8 | s | $Cu_2Mg$, $CuMg_2$ | 590-860 | Mg | [34]/1998 |
| xMg + (1-x)Cu, 0.027 < x < 0.870 | l | | 873-1073 | Mg, Cu | [35]/2000 |
| xCa + (1-x)Cu, 0.024 < x < 0.888 | l | | 973-1173 | Ca, Cu | [35]/2000 |
| xAl + (1-x)Ti, x = 0.45, 0.62 | s | TiAl | 1223-1674 | Al, Ti | [36]/1999 |
| xAl + (1-x)Ti, 0 < x< 1 | s | | | Ti, Al | [37]/1997 |
| $x_1$Al + $x_2$Ti + (1-$x_1$-$x_2$)Nb | s | $Ti_3Al$, TiAl | 1170-1635 | Ti, Al | [38]/1999<br>[37]/1997 |
| $x_1$Al + $x_2$Ti + (1-$x_1$-$x_2$)Cr | s | | 1228-1521 | Al, Ti, Cr | [36]/1999 |
| xAl + (1-x)Mn, 0.58 > x > 0.38 | l | | 1250-1550 | Al, Mn | [39]/1994 |
| xAl + (1-x)Mn, 0.58 > x > 0.38 | s | $Al_{0.57}Mn_{0.43}$, $Al_{0.50}Mn_{0.50}$, $Al_{0.45}Mn_{0.55}$, | 1100-1275 | Al, Mn | [40]/1992 |
| xAl + (1-x)Fe<br>x = 0.815, 0.659, 0.526, 0.420 | l | | 1410 | Al | [41]/1996 |
| xAl + (1-x)Fe, 0.656 > x > 0.097 | s, l | | 1500-1670 | Fe, Al | [42]/1993 |
| xAl + (1-x)Cu, 0.955 > x > 0.091 | l | | 1150-1680 | Al, Cu | [43]/1998 |
| xAl + (1-x)Ni, 0.3 > x > 0 | s, l | $Ni_3Al$ | 1389-1734 | Ni, Al | [44]/1990, [37]/1997 |
| $(Al_{0.22}Ni_{0.78})_{0.995}B_{0.005}$ | s | $Ni_3Al$ | 1400-1670 | Ni, Al | [45]/1990 |
| x($Ni_3Al$) + (1-x)Fe, 0 < x < 0.08 | s | $Ni_3Al$ | 1304-1698 | Ni, Al, Fe | [46]/1996<br>[37]/1997 |
| x($Ni_3Al$) + (1-x)Co, 0 < x < 0.15 | s | $Ni_3Al$ | 1326-1581 | Ni, Al, Co | [47]/1997<br>[37]/1997 |
| (0.25-x)Al + 0.75Ni + xHf;<br>x($Ni_3Al$) + (1-x)Hf, 0 < x < 0.10 | s | $Ni_3Al$ | 1361-1680 | Ni, Al | [48]/1992<br>[37]/1997 |
| (0.25-x)Al + 0.75Ni + xTi, 0 < x < 0.25 | s | $Ni_3Ti$ | 1350-1650 | Ni, Al, Ti | [49]/1996 |
| $Ti_{0.58}Ge_{0.42}$ | s | $Ti_5Ge_3$, $Ti_6Ge_5$ | 1665-1880 | Ti, Ge | [50]/2000 |
| xV + (1-x)Ge, 0.6 < x < 0.9 | s | $V_3Ge_{1-x}$, $V_5Ge_3$, $V_{11}Ge_8$, $V_{17}Ge_{31}$ | 1750-1980 | V, Ge | [51]/2000 |
| xCr + (1-x)Ge, 0.625 < x < 0.93 | s | $Cr_3Ge$, $Cr_5Ge_3$ | 1400-1600 | Cr, Ge | [52]/2001 |
| xCr + (1-x)Fe, 0.906 > x > 0.012 | s | | | Cr | [53]/1990 |
| xCr + (1-x)Fe, 0 < x < 1 | s | | 1304-1630 | Cr | [53]/1990<br>[54]/1990 |
| xCr + (1-x)Ni, 0.6989 < x < 0.9405 | s | bcc | 1300-1650 | Cr, Ni | [55]/1995 |
| xCr + (1-x)Ni, 0.102 < x < 0.636 | l | | 1773 | Cr, Ni | [56]/1993 |
| x($Ni_{0.86}Cr_{0.14}$) + (1-x)Fe | s | fcc | 1673 | Fe, Ni, Cr | [57]/1995 |
| $x_1$Cr + $x_2$Ni + (1-$x_1$-$x_2$)Fe | s | fcc | 1650 | Fe, Cr, Ni | [58]/1998 |
| $x_1$Cr + $x_2$Ni + (1-$x_1$-$x_2$)Fe | l | | 1850-1950 | Fe, Cr, Ni | [59]/1998<br>[58]/1998 |
| xCr + (1-x)Co, 0.145 < x < 0.9227 | s | bcc, fcc | 1580-1790 | Cr, Co | [60]/1998 |
| xCr + (1-x)Co, 0.272 < x < 0.605 | l | | 1710-1860 | Cr, Co | [61]/1999 |
| xCr + (1-x)Co, 0.050 < x < 0.501 | l | | 1773 | Cr, Co | [56]/1993 |

**Table 2. Contd…**

| Sample in the Effusion Cell | State of Condensed Phase | Solid Compounds | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|---|---|
| xMn + (1-x)Fe, 0 < x < 1 | s | | 967-1410 | Mn | [54]/1990 |
| xMn + (1-x)Cu, 0.7314 > x > 0.0462 | l | | 1310-1480 | Cu, Mn | [62]/1996 |
| xMn + (1-x)Te, 0 < x < 0.5 | s | $\underline{MnTe, MnTe_2}$ | 650-750 K | $Te_2$ | [63]/2002 |
| xFe + (1-x)Cu, 0.899 < x < 0.9983 | l | | 1770-1916 | Fe, Cu | [64]/2001 |
| $Fe_2Zr$ | s | $Fe_2Zr$ | 1550-1756 | Fe | [65]/1993 |
| xFe + xNi + (1-2x)Co | s | | 1500-1690 | Co, Fe | [66]/1993 |
| xFe + xNi + (1-2x)Co | l | | 1850 | Co, Fe | [67]/1993 |
| $x_1Fe + (1-x_2)Ni + (1-x_1-x_2)Cu$ | l | | 1623 | Ni, Cu, Fe | [68]/1997 |
| xCo + (1-x)Ni, 0.096 < x < 0.887 | l | | 1773 | Co, Ni | [56]/1993 |
| xNi + (1-x)Zr, 0.012 < x < 0.994 | s | $Ni_5Zr$, $Ni_7Zr_2$, $Ni_{21}Zr_8$, $Ni_{10}Zr_7$, $Ni_{11}Zr_9$, NiZr, $NiZr_2$ | 971-1859 | $ZrF_4$, Na, Mg, Ca | [69]/2003<br>[70]/2002 |
| xNi + (1-x)Cu, 0 < x < 0.5 | l | | 1623 | Ni, Cu | [68]/1997 |
| xNi + (1-x)Yb | s | $Ni_{17}Yb_2$, $Ni_5Yb$, $Ni_3Yb$, $Ni_2Yb$, NiYb | 734-1444 | Yb | [71]/2001 |
| xCu + (1-x)Zr, 0.027 < x < 0.949 | s | $Cu_9Zr_2$, $Cu_{51}Zr_{14}$, $Cu_8Zr_3$, $Cu_2Zr$, $Cu_{10}Zr_7$, CuZr, $Cu_5Zr_8$, $CuZr_2$ | 701-1740 | $ZrF_4$, K, Na, Mg, Ca | [72]/2003 |
| $x_1Cu + x_2Au + (1-x_1-x_2)Ge$ | l | | 1101-1762 | Cu, Au, Ge | [73]/1994 |
| xCu + (1-x)Ag<br>x = 0.850, 0.627, 0.390, 0.211 | l | | 1310 | Ag | [41]/1996 |
| $x_1Cu + x_2Ag + (1-x_1-x_2)Ge$ | l | | 1416 | Ag | [74]/1994 |
| xCu + (1-x)Gd, 0.156 < x < 0.724 | l | $\underline{CuGd}$, $\underline{Cu_2Gd}$ | 1282-1664 | Cu | [75]/1995 |
| xCu + (1-x)Nd, 0 < x < 1 | l | | 1600 | Cu, Nd | [76]/1993 |
| xZnTe + (1-x)CdTe, 0 < x < 1 | s | s.s. | 900 | Zn, Cd, $Te_2$ | [77]/2002<br>[78]/2003<br>[79]/2003 |
| GeTe + Ge | s | GeTe, Ge | 700-850 K | GeTe, $Te_2$, $GeTe_2$ | [80]/2002 |
| $Cr_2Zr$ | s | $Cr_2Zr$ | 1476-1704 | Cr | [65]/1993 |
| xTe + (1-x)Cr, 0.60 < x < 0.827 | s | $\underline{CrTe_{4-y}}$, $\underline{CrTe_3}$, $\underline{Cr_5Te_8}$, | 650-1120 | $Te_2$ | [81]/1994<br>[82]/1996 |
| xCo + (1-x)Cu, 0.141 < x < 0.750 | l | | 1347-1587 | Co, Cu | [83]/2000 |
| $In_2Te_3$, InTe | s | $In_2Te_3$, InTe | 443-667 | In, Te, $Te_2$, InTe, $In_2Te$, $InTe_2$, $In_2Te_2$ | [84]/2000 |
| xTe + (1-x)Mn, x = 0.496, 0.549 | s | MnTe | 1194-1343 | Mn, Te, $Te_2$ | [85]/1998<br>[82]/1996 |
| xTe + (1-x)Au, 0.48 < x < 0.67 | l | | 753 | $Te_2$ | [86]/1997 |
| $Mo_3Te_4 + MoTe_2$ | s | $\underline{Mo_3Te_4}$, $MoTe_2$ | 820-950 | Te, $Te_2$ | [87]/1993<br>[82]/1996 |
| xHf + (1-x)Al, 0.25 < x < 0.50 | s | $\underline{HfAl}$, $\underline{HfAl_3}$, $\underline{Hf_2Al_3}$, $\underline{Hf_5Al_4}$ | 1280-1680 | Al | [88]/1995 |
| xHf + (1-x)Ni, 0.0501 < x < 0.9408 | s | $\underline{NiHf_2}$, $\underline{NiHf}$, $\underline{Ni_{11}Hf_9}$, $\underline{Ni_{10}Hf_7}$, $\underline{Ni_7Hf_3}$, $\underline{Ni_{21}Hf_8}$, $\underline{Ni_3Hf}$, $\underline{Ni_7Hf_2}$, $\underline{Ni_5Hf}$ | 1423-1780 | Ni | [89]/1996 |
| $Pd_{1-x}Zr_x$, x = 0.04, 0.08, 0.12<br>$Pd + Pd_3Zr$, $Pd_3Zr + Pd_2Zr$ | s | $\underline{Pd_3Zr}$, $\underline{Pd_2Zr}$ | 1518-1981 | Pd | [90]/1990 |

**Table 2. contd…**

| Sample in the Effusion Cell | State of Condensed Phase | Solid Compounds | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|---|---|
| xPd + (1-x)Nb, 0.60 < x < 0.97 | s | | 1450-1750 | Pd | [91]/1991 |
| Ru + RuGe; RuGe + $Ru_2Ge_3$ | s | RuGe, $Ru_2Ge_3$ | 1529-1760 | Ge | [92]/1998 |
| $Ru_3Sn_7$ + $Ru_2Sn_3$; $Ru_2Sn_3$ + Ru | s | $Ru_3Sn_7$, $Ru_2Sn_3$ | 1317-1523 | Sn | [92]/1998 |
| $Pd_3In$ + Pd | s | $Pd_3In$, $Pd_{0.83}In_{0.17}$ | 1382-1495 | Pd, In | [20]/2000 |
| $Pd_3Pb$ + Pd | s | $Pd_3Pb$, $Pd_{0.85}Pb_{0.15}$ | 1191-1438 | Pd, Pb | [20]/2000 |
| $Pd_7Sn_2$ + $Pd_3Sn$; $Pd_7Sn_2$ + Pd | s | $Pd_3Sn$, $Pd_7Sn_2$, $Pd_{0.85}Sn_{0.15}$ | 1400-1553 | Pd | [20]/2000 |
| xPd + (1-x)Ni, 0.2005 < x < 0.8003 | l | | 1850 | Pd, Ni | [93]/1993 |
| xPd + (1-x)Ni, 0.2005 < x < 0.8003 | s | | 1500 | Pd, Ni | [94]/1992 |
| xPd + (1-x)Co, 0.10 < x < 0.80 | s | fcc | 1470 | Pd, Co | [95]/1995 |
| xPd + (1-x)Au, 0.1015 < x < 0.8953 | l | | 1850 | Pd, Au | [96]/1990 |
| xPd + (1-x)Au, 0.2921 < x < 0.8953 | s | | 1500 | Pd, Au | [97]/1990 |
| $x_1$Pd + $x_2$Pt + (1-$x_1$-$x_2$)Ge | l | | 1820 | Pd, Ge | [98]/1999 |
| $x_1$Ag + $x_2$In + (1-$x_1$-$x_2$)Sn | l | | 1273-1523 | Ag, In | [99]/2001 |
| xLa + (1-x)Bi | s | $LaBi_2$, LaBi, $La_4Bi_3$, $La_5Bi_3$, $La_2Bi$ | 795-1066 | $Bi_2$ | [100]/2000 |
| xLa + (1-x)Ce, 0 < x < 1 | l | | 1592-1781 | La, Ce | [101]/1998 |
| xLa + (1-x)Nd, 0 < x < 1 | l | | 1474-1767 | Nd | [102]/1998 |
| xLa + (1-x)Gd, 0 < x < 1 | l | | 1588-1797 | La, Gd | [103]/1997 |
| xLa + (1-x)U, 0.01 < x < 0.99 | l | | 1619-1886 | La, U | [104]/1999 |
| xCe + (1-x)U, 0.01 < x < 0.99 | l | | 1619-1886 | Ce, U | [104]/1999 |
| xFe + (1-x)U, 0.05 < x < 0.90 | s,l | $UFe_2$, $U_6Fe$ | 1440-1850 | Fe | [105]/1992 |
| 0.997U + 0.003Fe | l | | 1780-2180 | U, Fe | [106]/1993 |
| xGa + (1-x)U, 0.05 < x < 0.28 | s,l | $U_2Ga_3$ | 1100-1670 | Ga | [105]/1992 |
| xZr + (1-x)U, x = 0.244, 0.393 | l | | 1700-1973 | U | [107]/1992 |
| xZr + (1-x)Pu, 0.20 < x < 0.94 | s, l | | 1400-1900 | Pu | [108]/1994 |
| Aluchrom (Ni/Cr/Al base) | s | | 1313-1556 | Ni, Cr, Al | [109]/1992 |
| ODS MA 6000 (Fe/Cr/Al base) | s | | 1393-1562 | Fe, Cr, Al | [109]/1992 |
| M5-alloy (71Fe20Ni6Cr3Mn) | s | | 1550-1900 | Fe, Cr, Ni | [110]/1993 |
| steel AISI 316 (Fe, Ni, Cr base) | s, l | | 1293-2120 | Fe, Cr, Ni, Mn | [111]/1995 |
| Zircaloy-4 (Zr-base) + Te | s, l | | 1062-2315 | $Te_2$, SnTe, Sn, Fe, Cr | [112]/1990 |
| xNi +(1-x)La 0<x<1 over the "entire compositions range " | l | | 1023-1854 | Ni, La | [113]/2005 |
| Al + Mn (0-50.1 at % Mn) | l | | 1043-1670 | Al, Mn | [114]/2006 |
| Al+Fe+Ni, B2 | s | | 1180-1508 | Al, Fe, Ni, | [115]/2006 |
| xAl+(1-x)Cu 0<x<1 | l | | 1035-1727 | Al, Cu | [116]/2007 |
| xNi+(1-x)La 0<x<1 | s, l | | 685-1854 | Ni, La | [117]/2007 |
| Haynes 230, Inconel 617 Ni-based alloy, commercial alloys | s | | 1423-1548 | Cr | [118]/2008 |
| (1-x)Al+xMn 0<x<50.1<br>(1-x)Al+xCu, (1-x)Al+xFe, 0<x<1<br>(1-$x_1$-$x_2$) Al+$x_1$Fe+$x_2$Cu 0<$x_1$, $x_2$ <1 | l | | 1043-1670<br>1123-1878 | Cu, Mn | [119]/2008 |
| (1-x)Ni+xSb 0.20<x<0.54 | s | $Ni_3Sb$, γ-NiSb | 773-1423 | Sb, $Sb_2$, $Sb_3$, $Sb_4$ | [120]/2007 |

**Table 2. contd…**

| Sample in the Effusion Cell | State of Condensed Phase | Solid Compounds | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|---|---|
| (1-x)Yb+xGe 0.35<x<1 | s | $Yb_2Ge$, $Yb_5Ge_3$, $Yb_5Ge_4$, $Yb_{11}Ge_{10}$, $Yb_3Ge_5$ | 801-1455 | Yb, Ge | [121]/2007 |
| (1-x)Fe+xZr x=50-85 at% | l | | 1503-1843 | Fe | [122]/2005 |
| $(1-x_1-x_2)$Cu+$x_1$In+$x_2$Sn, $x_1$=0.20, 0.25, 0.29, 0.30, 0.40 Sn/Cu=1 a 0.05<$x_1$<0.8) | l | | 1273-1473 | $Cu^+$/$Sn^+$ | [123]/2006 |
| (1-x)Ni+xLa 0<x<1 | s, l | NiLa, $Ni_2La$, $Ni_5La$, $Ni_{17}La_4$, β-$Ni_7La_2$, fcc Ni, fcc La | 685-1854 | Ni, La | [124]/2006 |
| (1-x)Al.+xMn x=0-26 at%<br>x=0-50.1 at% | s<br>l | fccAl+αMn | 628-1193<br>1043-1670 | Mn, Al | [125]/2006 |
| $(1-x_1-x_2)$Ag+$x_1$In+$x_2$Sn, $x_1$=0.10, 0.117, 0.20, 0.30, 0.40, 0.50 | l | | 1273-1473 | $Ag^+$/$Sn^+$, $Ag^+$/$In^+$ | [126]/2008 |
| (1-x)Al+xMn 0<x<0.26<br>0<x<0.501 | s,<br>l | αMn-fcc-Al | 628-1193<br>1043-1670 | Mn, Al | [127]/2008 |
| (1-x)Fe+xZr x=50-90 at% | l , l+s | $Fe_2Zr$ | 1501-1852 | Fe, Zr | [128]/2008 |
| 3 different commercial 18ct. gold alloys | s,l | | 773-2273 | Au, Ag, Cu | [129]/2008 |
| 45.1Fe+39.8Al+15.1Cr (at%)<br>49.9Fe+19.9Al+30.2Cr (at%) | l, s | | 1431-1853 | Fe, Al, Cr | [130]/2008 |
| $(1-x_1-x_2)$Fe+$x_1$Co+$x_2$Cr $x_2/x_1$=9 and 3 | s | bcc | 1673 | Fe, Cr | [131]/2009 |
| $(1-x_1-x_2)$Fe+$x_1$Co+$x_2$Cr $x_2/x_1$=2/3 and $x_2/x_1$= 1/4 | s | fcc | 1673 | Fe, Cr | [132]/2009 |
| $(1-x_1-x_2)$Au+$x_1$Co+$x_2$Pd $x_1$ /(1-$x_1$-$x_2$)=1and $x_2/x_1$= 1 | l | | 1800 | Au, Pd | [133]/2009 |
| Au(s) + $H_2$(g)<br>Ga(s)+$H_2$(g) | l | | 1542-1678<br>1258-1260 | Au, $H_2$, AuH<br>Ga, $Ga_2$, GaH | [134]/2007 |
| xNi+(1-x)Al 0.32<x<0.50 | s , l | $Ni_{0.5}Al_{0.5}$, $Ni_xAl_{(1-x)}$ 0.32<x<0.50, $Al_3Ni_2$, AlNi | 1077-1592 | Al, Ni | [135]/2006 |
| (1-x)Al+xNi, x=0.43, 0.42, 0.35, 0.32 | s | $Al_3Ni_{1.747}$, $Al_3Ni_{2.025}$, $AlNi_{0.766}$, $AlNi_3$ | 1104-1278<br>1021-1122 | Al | [136]/2006 |

**Table 3. Mass Spectrometric Investigations for the Determination of Thermodynamic Properties of Solid or Liquid Systems Metal-Nonmetal. (Solid Compounds are given if the Thermodynamic Functions of Formation were Determined)**

| Sample in the Effusion Cell | State of Condensed Phase | Solid Compounds | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|---|---|
| xB + (1-x)Si, 0.015 < x < 1 | s,l | $SiB_6$, $SiB_{14}$, $SiB_{15}$, $SiB_{40}$, $SiB_n$, B(ss) | 1522-1880 | B, Si, $Si_2$ | [137]/2000 |
| $MgB_2$, $MgB_4$ | s | $MgB_2$, $MgB_4$, $MgB_7$ | 883-1154 | Mg | [138]/2002 |
| xSi + (1-x)P, 0.735 < x < 0.991 | l | | 1507-1831 | P, $P_2$ | [139]/2001 |
| xCa + (1-x)Si, 0.25 < x < 0.80 | s | $Ca_2Si$, $Ca_5Si_3$, CaSi, $Ca_{14}Si_{19}$, $CaSi_2$ | 971-1341 | Ca | [140]/2001 |
| xTi + (1-x)Si | l | | 2733 | Si, Ti | [141]/2000 |
| xCr + (1-x)P, 0.75 < x < 0.87 | s, l | $Cr_3P$, $Cr_{12}P_7$ | 1341-1819 | Cr, P, $P_2$ | [142]/1998 |
| $x_1$Cr + $x_2$Fe + $(1-x_1-x_2)$P | l | | 1403-1821 | Fe, Cr, P, $P_2$ | [143] /1998<br>[144]/1998 |
| $x_1$Mn + $x_2$Fe + $(1-x_1-x_2)$P | l | | 1302-1701 | Fe, Mn, P, $P_2$ | [143] /1998 |
| $x_1$Mn + $x_2$Fe + $(1-x_1-x_2)$Si | l | | 1435-1809 | Fe, Mn, Si, $Si_2$ | [143] /1998 |

**Table 3. contd…**

| Sample in the Effusion Cell | State of Condensed Phase | Solid Compounds | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|---|---|
| $xFe + (1-x)B$, $0.270 < x < 0.903$ | l | | 1473-1854 | Fe, B | [145]/2002 |
| $xFe + (1-x)B$, $0.270 < x < 0.903$ | s | FeB, $Fe_2B$ | 1449-1854 | Fe, B | [146]/2001<br>[147]/2003 |
| $xFe + (1-x)As$, $0.8999 < x < 0.9901$ | l | | 1624-2013 | Fe, As, $As_2$ | [148]/1991 |
| Fe + Cu + S + As | s,l | | 1473 | As, $As_2$, AsS | [149]/2001 |
| $xNi + (1-x)P$, $0.675 < x < 0.74$ | s | $Ni_3P$, $Ni_5P_2$, $Ni_{12}P_5$, $Ni_2P$ | 971-1440 | Ni, $P_2$ | [150]/2003 |
| $x_1Cu + x_2Ni + (1-x_1-x_2)S$ | l | | 1500 | Cu, $S_2$ | [151]/2000 |
| $x_1Cu + x_2Ag + (1-x_1-x_2)Cu_2S$ | l | | 1373-1473 | Ag | [152]/1998 |
| $x_1Cu + x_2Au + (1-x_1-x_2)Si$ | l | | 1750 | Si, Cu, Au | [153]/1998 |
| $xGe + (1-x)Si$, $0.087 < x < 0.921$ | l | | 1723 | Si, Ge | [154]/1992 |
| $xYb + (1-x)Si$ | s | $Yb_5Si_3$, $Yb_5Si_4$, YbSi, $Yb_3Si_4$, $YbSi_{2-x}$ | 781-1395 | Yb | [155]/2003 |
| $Ru_2Si_3$ + RuSi | s | $Ru_2Si_3$ | 1698-1909 | Si | [92]/1998 |
| $YbSi_{1.74}$-liquid solution at%Si ~ 65% | l | | 1421-1512 | Yb | [156]/2005 |
| $(1-x)Cr+xCr_3P$, $0<x<1$ | s | $\underline{Cr_3P}$ | 1523-1623 | $P_2$, | [157]/2008 |
| $(1-x)Cu+xCu_3P$, $0<x<1$ | s | $\underline{Cu_3P}$, $\underline{fcc}$ | 1160-1250 | $P_2$, Cu | [158]/2009 |
| $MgB_2$, $MgB_4$, $MgB_7$, $MgB_{20}$ | s | $\underline{MgB_{20}}$, $\underline{MgB_7}$, $\underline{MgB_2}$, $\underline{MgB_4}$ | 1112-1467 | Mg | [159]/2005 |
| $(1-x_1-x_2)\ Cu_2S + x_1FeS + x_2As$, $(1-x_1-x_2)/x_1 > 15.4$<br>30 % < Cu in $FeS-Cu_2S$ <80% | l | | 1473 | As | [160]/2005 |
| $(1-x)Sr+xSi$ $0.34<x<0.78$ at%Si | s | $\underline{Sr_2Si}$, $\underline{Sr_5Si_3}$, $\underline{SrSi}$, $\underline{SrSi_2}$ | 665-1300 | Sr | [161]/2006 |
| $x_1Fe+x_2\ F + C$ $0.2<x_1<0.92$ mass % $4.24\ \% < x_2 < 4.40\ \%$ | l | | 1473-1673 | $P_2$ | [162]/2007 |
| $(1-x)Ba+xSi$ $0.35<x<95$ at%Si | s,l | $\underline{Ba_2Si}$, $\underline{Ba_5Si_3}$, $\underline{BaSi}$, $\underline{Ba_3Si_4}$, $\underline{BaSi_2}$ | 893-1325 | Ba | [163]/2008 |
| $(1-x)Si+xSn$ $0<x<1$ | gas | | 1474-1944 | SiSn, $Si_2Sn$, $SiSn_2$, $Si_3Sn$, $Si_2Sn_2$, $SiSn_3$, Si, Sn, $Si_2$, $Sn_2$, $Si_3$, $Sn_3$ | [164]/2009 |

**Table 4. Summary of Mass Spectrometric Studies of Oxide Systems. (The Gaseous Species or Solid Compounds are Underlined if their Thermodynamic Functions of Formation or of Dissociation are given)**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|
| $Na_2O_2$, $Na_2O$ | 1100-1162 | Na, $O_2$, $Na_2O$, NaO | [165]/1993 |
| MgO | - | Mg, O, $O_2$ | [166]/2000 |
| $MgO + MgCr_2O_4$ | 1750 K-2080 | Cr, CrO, $CrO_2$, Mg, LaO | [167]/2001 |
| $BaO + GeO_2$ | 1670-1788 | BaO,GeO, $\underline{BaGeO_2}$ | [168]/1996 |
| $Ti_{10}O_{19}$ | 1753-1946 | TiO, $TiO_2$, O, $O_2$ | [169]/1990 |
| $TeO_2$ | 750-950 | $Te_2$, $(TeO)_x$, $\underline{(TeO_2)_x}$, x = 1, 2, 3 | [170]/1997 |
| $V_2O_5 + H_2O$ | | $V_4O_{10}$, $V_4O_8$, $V_2O_3(OH)_4$, $H_2O$, $O_2$ | [171]/1998 |
| ZnO | 1472-1623 | Zn, $O_2$ | [172]/1993 |
| ZnO | 450-1446 | Zn, $O_2$, $\underline{(ZnO)}$ | [173]/2003<br>[174]/2002 |
| $CuO + Cu_2O$ | 679-1033 | $O_2$ | [175]/1995 |

**Table 4. contd…**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|
| $NiO + CuO$ | 1472-1623 | $Cu, CuO, Ni, NiO, O_2$ | [172]/1993 |
| $ZnO + CuO$ | 1472-1623 | $Zn, Cu, CuO, O_2$ | [172]/1993 |
| $Pd(s) + O_2$ | 1764-1814 | $Pd, O, PdO$ | [176]/2000 |
| $Tc_xO_y + O_2 + H_2O$ | 873-1373 | $Tc_2O_7, TcO_3, TcO_3(OH), Tc_2O_5, TcO_2(OH)_3$ | [177]/1993 |
| $SnO_2$ | 1160-1450 | $SnO, Sn_2O_2, O_2$ | [178]/1999 |
| $Sn(l) + SnO_2(s)$ | 820-1160 | $SnO, Sn_2O_2, Sn_4O_4, Sn_6O_6$ | [179]/1996 |
| $CeO_{1.99}, Ce_2O_{2.96}$ | 1700-2200 | $CoO, CeO_2, O$ | [180]/2000 |
| $PbO$<br>$Pb(l) + O_2$ | 838-1018 | $PbO, Pb_2O_2, Pb_4O_4$ | [181]/1994 |
| $PbO$ | 890-1100 | $PbO, Pb_2O_2, Pb_4O_4, Pb, O_2$ | [182]/1997 |
| $Bi_2O_3$ | 991-1015 | $Bi, O_2$ | [183]/1998 |
| $UO_{2+x}$ | 1473-1873 | $UO_3, O_2$ | [184]/2003 |
| $UO_{2-x} + U$ | 2000-2250 | $U, UO, UO_2$ | [185]/2002 |
| $UO_{2+x} + MgO$ | 1723-1923 | $UO_3, Mg, O_2$ | [186]/2001 |
| $Eu_2O_3 + UO_2 + WO_3$<br>$EuPO_4 + UO_2$ | 2150-2420 | $UO_3, U_2O_2, U_2O_3, U_2O_4$ | [187]/1991 |
| $PuO_2$;<br>$(U,Pu)O_2$ | 1800-1900 | $PuO_3$ | [188]/2000 |
| $Li_2TiO_3$ | 1373-1573 | $Li, LiOH, Li_2O, LiO, H_2O, H_2$ | [189]/1997<br>[190]/2000 |
| $Li_2TiO_3 + H_2$ $(D_2)$ | 1423-1573 | $Li, O_2, D_2, D_2O, LiOD$ | [191]/2003 |
| $Li_4TiP_2O_9$ | 1100-1300 | $LiPO_3, LiPO_2, PO, O_2, P_n$, n = 1-4 | [192]/1997 |
| $Li_{0.2}VO_{2.6}$ | 730-1016 | $LiVO_3, O_2$ | [193]/1996 |
| $Li_2ZrO_3$ | 1234-1689 | $Li, LiO, Li_2O, O_2$ | [194]/1993<br>[190]/2000 |
| $Li_8ZrO_6$ | 1181-1429 | $Li, LiO, Li_2O, Li_2O_2, Li_3O, O_2$ | [195]/1996 |
| $Li_2MoO_4$ | 1403-1504 | $Li_2MoO_4, Li_2O, MoO_3$ | [196]/1999 |
| $Li_2SnO_3$ | 1455-1590 | $Li, O_2, LiO, Li_2O, SnO$ | [197]/1991 |
| $NaPO_3$ | 1044-1434 | $NaPO_3, Na_2P_2O_6, Na$ | [193]/1993 |
| $Na_3PO_4$ | 1261-1693 | $Na, O_2, NaPO_3$ | [193]/1993 |
| $NaBiO_2$ | 1200-1250 | $BiO, Bi, NaBiO_2$ | [198]/1999 |
| $NaUO_3+Na_2UO_4+Na_2U_2O_7$ | 1117-1290 | $Na$ | [199]/1994 |
| $KVO_3$, l | 1160-1710 | $KVO_3, (KVO_3)_2$ | [200]/1990 |
| $K_2MoO_4$ | 1170-1320 | $K_2MoO_4$ | [201]/2002 |
| $K_2WO_4$ | 1190-1300 | $K_2WO_4$ | [202]/2002 |
| $KTcO_4 + KReO_4$ | < 1173 | $KTcO_4, (KTcO_4)_2$ | [203]/1993 |
| $Rb_2MoO_4$ | 1102-1307 | $Rb_2MoO_4$ | [204]/2000 |
| $Cs_2MoO_4$ | 1135-1245 | $Cs_2MoO_4$ | [205]/1993 |
| $Cs_2TeO_4, Cs_2TeO_3$ | 1002-1077 | $Cs_2TeO_3, O_2$ | [206]/1994 |
| $CsOH + TcO_x + O_2$ | < 1173 | $CsTcO_4, (CsTcO_4)_2$ | [203]/1993 |
| $Li_2WO_4$ | 1320-1480 | $Li_2WO_4, Li_2O, WO_3$ | [207]/2000 |
| $Na_2WO_4$ | 1230-1380 | $Na_2WO_4$ | [208]/2001 |
| $Cs_2WO_4$ | 1080-1200 | $Cs_2WO_4$ | [209]/2001 |

**Table 4. contd…**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|
| $Cs_2WO_4$ | 1017-1233 | $Cs_2WO_4$ | [210]/2001 |
| $CsBiO_2$ | 1130-1150 | Bi, BiO, $\underline{CsBiO_2}$ | [198]/1999 |
| $Cs_2UO_4 + H_2 + O_2$ | 873-1373 | Cs, CsOH, CsO, $H_2O$, $O_2$ | [211]/1998<br>[212]/1999 |
| $Cs_2U_4O_{12} + H_2 + O_2$ | 1273-1573 | Cs, CsOH, $UO_3$, $H_2O$, $O_2$ | [213]/1999<br>[212]/1999 |
| BeO-$MoO_3$ | 2450-2720 | $(BeO)_n$, n=1-5, $MoO_n$, n=1-3, $BeMoO_3$ | [214]/2001<br>[215]/2001 |
| Be-$TiO_2$, BeO-$Ta_2O_5$, BeO-$Nb_2O_5$ | 2450-2720 | $(BeO)_n$, n=2-4, XO, $XO_2$, $BeXO_3$, X=Ti,Ta,Nb | [214]/2001 |
| BeO-$Nb_2O_5$ | 2230-2450 | $(BeO)_n$, n=1-4, NbO, $NbO_2$, $BeNbO_3$ | [216]/2001 |
| MO-$Ta_2O_5$, M = Be, Ca, Sr, Ba | 2450-2720 | $(BeO)_n$, n=1-4, M, MO, TaO, $TaO_2$, $MTaO_2$, $MTaO_3$ | [217]/1999 |
| BeO-$WO_3$ | 2271-2475 | $Be_3O_3$, $Be_4O_4$, $WO_2$, $WO_3$, $BeWO_3$, $BeWO_4$, $Be_2WO_4$ | [215]/2001 |
| BeO-$WO_3$, $BeTaO_3$, $BeNbO_3$, $BeTiO_3$ | 2450-2720 | $(BeO)_n$, n = 2-5, $WO_2$, $WO_3$, $W_2O_6$, $W_3O_9$, $BeWO_3$, $BeWO_4$, $Be_2WO_4$, $Be_2WO_5$ | [214]/2001 |
| xCaO + (1-x)$Al_2O_3$, 0.143 < x < 0.860 | 1833-2033 | Ca, Al, AlO, CaAlO, $O_2$, O | [218]/1995<br>[219]/1995 |
| CaO-$Nb_2O_5$, SrO-$Nb_2O_5$ | 2200-2400 | MO, NbO, $NbO_2$, $MNbO_3$, M = Ca, Sr | [216]/2001 |
| $\underline{SrUO_3}$ + $UO_2$ | 1534-1917 | Sr, $UO_2$, SrO | [220]/1997 |
| $\underline{SrUO_3}$ + $H_2$ + $H_2O$ | 1470-1920 | Sr, $H_2$, $H_2O$ | [221]/1997 |
| $\underline{SrPuO_3}$ + $PuO_2$ | 1433-1913 | Sr, PuO | [222]/1997 |
| xSrO + (1-x)BaO, 0.101 < x < 0.872 | 1430-1530 | Sr, Ba | [223]/1992 |
| xBaO + (1-x)$Y_2O_3$, x = 0.8, 0.57, 0.4 | 1450-1850 | BaO, $Ba_2O_2$, Ba, O, $O_2$ | [224]/1995 |
| $\underline{BaZrO_3}$ + $ZrO_2$; | 1899-2085 | BaO | [225]/1994 |
| $BaZrO_3$ + $\underline{Ba_2ZrO_4}$ | 1566-1732 | Ba, BaO | [225]/1994 |
| BaO-$Nb_2O_5$ | 1989-2493 | Ba, BaO, NbO, $NbO_2$, $BaNbO_2$, $BaNbO_3$, $BaNb_2O_6$ | [216]/2001 |
| $Ba_2CaWO_6$ | 1620-1860 | Ba, Ca, BaO, $WO_3$, $\underline{BaWO_4}$ | [226]/1993 |
| $Ba_2SrWO_6$ | 1620-1860 | Ba, Sr, BaO, $WO_3$, $\underline{BaWO_4}$ | [226]/1993 |
| $\underline{BaUO_3}$ | 1770-1920 | BaO, Ba, $UO_2$ | [227]/1996 |
| $BaUO_3$ + $H_2$ + $H_2O$ | 1470-1920 | BaO, $H_2O$, $H_2$ | [221]/1997 |
| $BaPuO_3$ | 1673-1873 | Ba, BaO | [228]/1999 |
| $BPO_4$ | 1447-1540 | $B_2O_3$, $P_4O_{10}$, PO, $PO_2$, $\underline{BPO_4}$, $\underline{BPO_3}$ | [229]/1999<br>[230]/1998<br>[231]/1997 |
| $AlPO_4$ | 1548-1674 | $\underline{PO, PO_2}$ | [231]/1997<br>[230]/1998 |
| $GaPO_4$ | 1447-1700 | $\underline{GaPO_3}$, $\underline{GaPO_2}$, $PO_2$, PO, $Ga_2O$, $O_2$ | [232]/1999<br>[230]/1998 |
| $InPO_4$, $In(PO_3)_3$ | 1200-1591 | $\underline{InPO_3}$, $InPO_2$, $P_4O_{10}$, PO, $PO_2$, In, $O_2$ | [230]/1998<br>[233]/1997 |
| $\underline{TlPO_3, TlPO_4}$ | 970-1100 | Tl, $PO_2$, $\underline{TlPO_3}$, $(TlPO_3)_2$ | [234]/1998<br>[230]/1998 |
| $SiP_2O_7$ | 1300-1750 | $PO_2$, PO, SiO, $O_2$ | [235]/1995 |
| $GeP_2O_7$ | 1262-1386 | $P_4O_{10}$, GeO, $PO_2$, $\underline{GePO_3}$ | [235]/1995 |

**Table 4. contd…**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|
| $U_{0.91}Y_{0.09}O_{1.966}$, $U_{0.88}Y_{0.12}O_{1.950}$ | 1800-2200 | U, UO, $UO_2$, $O_2$ | [236]/2002 |
| $xZnO + (1-x)P_2O_5$, $0.45 < x < 0.75$ | 940-1380 | Zn, $P_2$, PO, $PO_2$, $P_2O_4$, $O_2$, $ZnP_2O_6$ | [237]/1998<br>[238]/1996 |
| $x_1ZnO + x_2SnO + (1-x_1-x_2)P_2O_5$ | 900-1850 | PO, $P_2$, $PO_2$, Zn, Sn, SnO, $SnPO_2$, $SnPO_3$ | [239]/1998 |
| $ZnP_2O_6$, $Zn_2P_2O_7$, $Zn_3P_2O_8$ | 946-1405 | Zn, $P_2$, PO, $PO_2$, O | [240]/2001 |
| $TcO_x + ReO_2$ | < 1173 | $TcReO_5$, $TcReO_7$ | [241]/1993 |
| $\underline{LaGaO_3}$ + $\underline{La_4Ga_2O_9}$ | 1600-1900 | Ga, $Ga_2O$, $O_2$, GaO, LaO | [242]/2001<br>[243]/2002 |
| $La_{1-x}Sr_xGa_{1-y}Mg_yO_{3-(x+y)/2}$ | 1600-1900 | Ga, $Ga_2O$, $O_2$, GaO, Sr, SrO, Mg, LaO | [242]/2001<br>[244]/2001<br>[361]/2002<br>[245]/2003 |
| $\underline{LaGa_{1-x}Al_xO_3}$(s), 0=< $x$ =<1<br>$La_{0.9}Sr_{0.1}Ga_{0.8-x}Al_xMg_{0.2}O_{2.85}$, $x$ = 0.1, 0.2, 0.3 | 1623-1928 | Ga, $Ga_2O$, GaO, $O_2$, LaO, Mg, Sr, SrO | [362]/2003 |
| $\underline{LaCrO_3}$ + $La_2O_3$ | 1887-2333 | Cr, CrO, $CrO_2$, LaO | [246]/1996 |
| $LaCr_{1-x}Mg_xO_{3-\Delta}$, x = 0.03, 0.09, 0.14 | 1950-2050 | Cr, CrO, $CrO_2$, Mg, LaO | [167]/2001 |
| $La_{1-x}Ca_xCrO_{3-\Delta}$, $0.047 < x < 0.21$ | 1950-2050 | Cr, CrO, $CrO_2$, Sr, SrO, LaO | [247]/2001 |
| $La_{1-x}Sr_xCrO_{3-\Delta}$, $0.10 < x < 0.30$ | 1950-2050 | Cr, CrO, $CrO_2$, CaO, LaO | [248]/2001 |
| $La_{0.80}Sr_{0.20-x}Ca_xCrO_{3-\Delta}$, x = 0.05, 0.10, 0.15 | 1900-2100 | Cr, CrO, $CrO_2$, CaO, Sr, SrO, LaO | [249]/2001 |
| $xSnO_2 + (1-x)WO_3$, $0.50 < x < 1$ | 1250-1400 | SnO, $W_3O_9$, $SnWO_4$, $SnW_2O_7$, $Sn_2WO_5$, $O_2$ | [250]/2002 |
| $xBi_2O_3 + (1-x)SnO_2$, $0.10 < x < 0.975$ | 1000-1270 | Bi, BiO, $Bi_2O_3$, $Bi_4O_6$, SnO, $O_2$ | [251]/2002 |
| $Bi_2Sr_2Ca_2Cu_3O_y$, Pb-doped | 650-1050 | $O_2$, Bi | [252]/1995 |
| $xTiO_2 + (1-x)Nb_2O_5$, $0.10 < x < 0.90$ | 2200 | TiO, $TiO_2$, NbO, $NbO_2$ | [253]/2001 |
| $x_1TiO_2 + x_2ZrO_2 + (1-x_1-x_2)PbO$ | 873-1223 | PbO, $Pb_2O_2$ | [254]/1999 |
| $xMnO + (1-x)TeO_2$, $x \geq 0.5$ | 950 | $O_2$, $Te_2$, TeO, $TeO_2$ | [255]/2002 |
| $xZrO_2 + (1-x)UO_2$, $0.55 < x < 0.98$ | 2200-2650 | $ZrO_2$, ZrO, $UO_3$, $UO_2$, UO, O | [256]/1997 |
| $xZrO_2 + (1-x)UO_2$, $0.05 < x < 0.70$ | 2000-2400 | $UO_2$ | [257]/2001 |
| $Mn_{0.676}Zn_{0.261}Fe_{2.063}O_4$ | 1250-1603 | Zn, FeO, MnO | [258]/1996<br>[259]/1993 |
| $xLa_2O_3 + (1-x)UO_2$, x = 0.005, 0.01, 0.025 | 2273, 2393 | LaO, U, UO, $UO_2$, $UO_3$, O | [260]/2001 |
| $Bi_2O_3$+$Sb_2O_3$ in atomic ratio Sb/(Bi+Sb) = 0.1, 0.2, 0.25, 0.3, 0.4, 0.5, 0.6, 0.666, 0.8, 0.9 | 1160 | Bi, BiO, $Sb_4O_6$, $Bi_3SbO_6$, $Bi_2Sb_2O_6$, $BiSb_3O_6$, $Bi_2$, $Bi_2O_3$ | [261]/2007 |
| Bi-Sb-O system<br>The enthalpies of reactions were calculated according to the second and third laws. | 1100-1200 | Bi, BiO, $Sb_4O_6$, $\underline{Bi_3SbO_6}$, $\underline{Bi_2Sb_2O_6}$, $\underline{BiSb_3O_6}$, $Bi_2$, $Bi_2O_3$ | [262]/2009 |
| $NiO + SiO_2$ (Mo, W cell)<br>$NiO + MgHPO_4$<br>$NiO + BaO + SIO_2$ | 1600-2000 | NiO, $XO_2$, $XO_3$, SiO, $\underline{NiXO_4}$, Ni (X=Mo,W)<br>$\underline{NiPO_2}$, $\underline{NiPO_3}$, NiO, PO, $PO_2$, Ni<br>Ni, Ba, BaO, $\underline{BaNiO_2}$ | [263]/2006 |
| $Na_2CO_3$+$Fe_2O_3$ (2:3) | 918-1023 | $CO_2$ | [264]/2006 |
| $K_2O + Ge_2O$ (54.80, 59.59, 62.41, 66.40, 71.83, 82.93, 91.00, 100 mol% Ge) | 950-1550 | K, $O_2$, GeO | [265]/2005 |
| Mn, MnO, $TeO_2$, $MnCO_3$ | 850-950 | $Te_2$, TeO, $TeO_2$, $O_2$ | [266]/2006 |
| YbSi(s), $YbSi_{2-x}$(s) + $H_2$(g) or $H_2$(g)/$O_2$(g) | 1273-1622 | $H_2$, $H_2O$, Yb, $\underline{YbO}$, $\underline{YbH}$, $\underline{YbOH}$, SiO, $SiO_2$ | [267]/2005 |
| PbO +$O_2$(g)<br>$GeO_2$ + $O_2$(g) | 1099-1201<br>1220 | Pb, PbO, $Pb_2O_2$,<br>GeO, $O_2$ | [268]/2007 |

**Table 4. contd…**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|
| $H_3BO_3$ | 295-342 | $\underline{H_3BO_3}$ | [269]/2008 |
| $\underline{TeO_2}$ | 805-905 | $Te_2$, $\underline{TeO_2}$, $\underline{(TeO_2)_2}$, $\underline{TeO}$, $\underline{(TeO)_2}$ $O_2$ | [270]/2005 |
| $SiO_2 + H_2O(g)$ | 1173, 1373, 1673 | $Si(OH)_4$, $SiO(OH)_2$, | [271]/2005 |
| $UO_2 + O_2(g)$<br>$U_3O_8$ | 1500 and 1600<br>1400-1900 | $UO_3$, $O_2$<br>O, $O_2$, U, UO, $UO_2$, $UO_3$ | [272]/2005 |
| $CeO_2$,<br>$SrCeO_3+CeO_2$,<br>$\underline{SrCeO_3}$,<br>$SrCe_{0.95}Yb_{0.05}O_{2.98}$ | 1495-1973<br>1601-1988<br>1643-1890<br>1737-1884 | $CeO_2$, CeO, Sr, $SrO_2$, | [273]/2008 |
| $U_3O_8$<br>$UO_2$ | <2800<br>750-850 | UO, $UO_3$ (I, Xe, Te, St, $BaZrO_2$, Mo, Ru, Pd, Rh) | [274]/2006 |
| $Al_2O_3$+C | 1400-2100 | Al, $Al_2O$, CO | [275]/2007 |
| NiAl + $Al_2O_3$ | 1400-1750 | Al, Ni | [276]/2007 |
| $UO_2$<br>$U_3O_8$ | <2800<br><1900 | UO, $UO_2$, $UO_3$, Cs, BaO, SrO, Mo, Te, I,Tc, Sr, Ba, Rb, CsI, $MoO_3$, MoO, TeO, Tc, $TcO_3$ | [277]/2008 |
| $K_{0.5}Bi_{0.5}TiO_3$ | <940 | K, Bi, BiO | [278]/2009 |
| Y-$Y_2O_3$ | 1423-1573 | Y | [279]/2009 |
| CaO+MgO+$Al_2O_3$+$Cr_2O_3$+FeO+$SiO_2$, FeO(0.031-0.078), MgO(0.055-0.166), CaO(0.519-0.668), $Cr_2O_3$(0.062-0.168), $Al_2O_3$(0.007-0.013), $SiO_2$(0.060-0.159) | 1850-2750 | CrO, $CrO_2$, Cr, Fe, SiO, Ca, Al, Mg | [280]/2009 |
| $UO_2$ | 1800-2700 | X, XO, $XO_2$, where X= $^{234}U$, $^{235}U$, $^{236}U$, $^{237}Np$, $^{238}U$, $^{238}Pu$, $^{239}Pu$, $^{240}Pu$, $^{241}Pu$, $^{241}Am$, $^{242}Pu$, $^{243}Am$, $^{244}Cm$, $UO_3$, Y, YO, where Y= $^{139}La$, $^{140,141}Ce$, $^{141}Pr$, $^{143,144,145,146}Nd$, $^{147,148,150,152}Sm$, $^{153}Eu$, $^{156}Gd$, $CeO_2$ | [281]/2008 |
| $(CaO)_4P_2O_5$, $(CaO)_3P_2O_5$ | 1523-1623 | $P_2$, PO | [282]/2009 |
| Commercial PWR fuel sample ($UO_2$) | < 2750 | $^{85}Kr$, $^{85}Rb$, $UO_2$, $^{135}Cs$, $^{238}UO_2$ He, Xe, $^{90}Sr$, $^{129}I$, $^{13}Te$, $^{137}Cs$, $^{138}Ba$, $^{87}Rb$, $^{138}BaO$ | [283]/2008 |
| {$\underline{LiAl_5O_8}$+$Li_2CO_3$+5$Al_2O_3$},<br>{$\underline{LiAl_5O_8}$+2$Li_2CO_3$+5$\underline{LiAlO_2}$},<br>{$\underline{LiAlO_2}$+2$Li_2CO_3$+$\underline{Li_5AlO_4}$}, | 614-750<br>604-723<br>614-750 | $CO_2$ | [284]/2008 |
| C<br>$UO_2$ | 3640-3660<br>2500-3040 | C, $C_2$, $C_3$, $C_5$<br>UO, $UO_2$, $UO_3$ | [285]/2005 |
| Al (in the Knudsen cell made of α-$Al_2O_3$ or $ZrO_2$+4%$Y_2O_3$) | 1197-1509 | $\underline{Al}$, $\underline{Al_2O}$ (ΔH sub and activities) | [286]/2006 |

**Table 5. Summary of Mass Spectrometric Studies of Glass (Silicates and Borates) Systems. (The Gaseous Species are Underlined if their Thermodynamic Functions of Formation or of Dissociation are Given)**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|
| $SiO_2$ (Mo) | 1610-1980 | SiO, $SiO_2$, $Si_2O_2$, O | [287]/2000 |
| SiO;<br>Si + $SiO_2$ | 1093-1486 | SiO | [288]/1993 |
| $SiO_2$(l) + $H_2O$ | 1963-2065 | SiO(OH), $SiO(OH)_2$, $SiO_2$ | [289]/1994 |
| $x_1Na_2O + x_2P_2O_5 + (1-x_1-x_2)SiO_2$ | 1222-1658 | $NaPO_3$, Na, $O_2$ | [290]/1993<br>[291]/1994 |
| $xNa_2O + (1-x)SiO_2$, $0.195 < x < 0.651$ | 942-1719 | Na, $Na_2O$, NaO, $O_2$, | [292]/1999<br>[293]/2000 |

**Table 5. contd…**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|
| $x_1Na_2O + x_2Cs_2O + (1-x_1-x_2)SiO_2$ | 950-1600 | Na, Cs, $O_2$ | [294]/1996 |
| $K_2O + SiO_2$ ($+Al_2O_3$), s | 869-1050 | $K_2O$, ($Al_2O$) | [295]/2000 |
| $xK_2O + (1-x)SiO_2$, $0.108 < x < 0.500$ | 1057-1730 | K, $K_2O$, KO, $KO_2$, $O_2$ | [296]/2000 |
| $(Na_xK_{2-x})Mg_5[Si_{12}O_{30}]$, $0.026 < x < 0.897$ | 1273 | Na, K | [297]/1993 |
| $xRbBO_2 + (1-x)CsBO_2$, $0 < x < 1$ | 764-978 | $RbBO_2$, $Rb_2(BO_2)_2$, $CsBO_2$, $Cs_2(BO_2)_2$, $RbCs(BO_2)_2$ | [298]/1992 |
| $xRbBO_2 + (1-x)SiO_2$, $0.077 < x < 0.87$ | 796-1175 | $RbBO_2$, $(RbBO_2)_2$ | [299]/1996 |
| $xCsBO_2 + (1-x)SiO_2$, $0.077 < x < 0.87$ | 731-1056 | $CsBO_2$, $(CsBO_2)_2$ | [300]/1999 |
| $xSiO_2 + (1-x)MgAl_2O_4$ (Mo), $0 < x < 0.7469$ | 1623-2523 | Mg, MgO, Al, AlO, $Al_2O$, SiO, $SiO_2$, AlSiO, $MoO_2$, $MoO_3$, O | [301]/2001 |
| $x_1FeO + x_2MgO + (1-x_1-x_2)SiO_2$ | 1850-1980 | Fe, Mg, SiO, $O_2$ | [302]/1992 |
| $CaO{\cdot}MgO{\cdot}2SiO_2$ (+Mo) | 1550-1870 | Ca, Mg, SiO, $SiO_2$, $MoO_2$, $MoO_3$ | [303]/1996 |
| $0.51CaO + 0.49B_2O_3$ | 1415-1450 | $Ca(BO_2)_2$, $B_2O_3$ | [237]/1998 |
| $xCaO + (1-x)SiO_2$, $0.50 < x < 0.90$ | 1993 | SiO, Ca, CaO, $CaSiO_3$, $SiO_2$, O | [304]/1991 |
| $x_1CaO + x_2Al_2O_3 + (1-x_1-x_2)SiO_2$ (+ Mo) | 1833-2033 | Al, AlO, $Al_2O$, SiO, $SiO_2$, $MoO_2$, $MoO_3$ | [305]/1996 |
| $x_1CaO + x_2Al_2O_3 + (1-x_1-x_2)SiO_2$ (+ Nb, Ta, Mo) | 1634-1841 | SiO, $NbO_2$, $MoO_2$, $TaO_2$ | [306]/1998 |
| $x_1CaO + x_2TiO_2 + (1-x_1-x_2)SiO_2$ | 1850-2200 | SiO, O | [307]/2000 |
| $xBaO + (1-x)B_2O_3$, x = 0.333, 0.50 | 1277-1535 | Ba, $\underline{BaBO_2}$, BO, $B_2O_2$, $B_2O_3$ | [308]/1990 |
| $SrO + B_2O_3 + SiO_2$ | 1337-1602 | Sr, $\underline{SrSiO}$, $\underline{SrBO_2}$, BO, $B_2O_2$, $B_2O_3$, SiO | [309]/1990 |
| $BaSiO_3$ | 1783-2143 | Ba, BaO, SiO, $SiO_2$, $\underline{BaSiO_3}$ | [310]/2000 |
| $xB_2O_3 + (1-x)SiO_2$, $0.224 < x < 0.896$ | 1450-1500 | $B_2O_3$ | [311]/1993 |
| $B_2O_3 + SiO_2$ + other oxides | 1273-1973 | $B_2O_3$, SiO, Si, $O_2$, O, Al, $Al_2O$, AlO, $XBO_2$, X = Li, Na, K | [312]/1990 |
| $B_2O_3 + SiO_2$ + other oxides | 900-1650 | $B_2O_3$, SiO, $O_2$, Pb, $XBO_2$, $X_2(BO_2)_2$, $XY(BO_2)_2$, X,Y = Li, Na, K, Cs | [313]/1998 |
| $xAl_2O_3 + (1-x)B_2O_3$, $0.92 < x < 0.50$ | 1248-1850 | $B_2O_3$ | [314]/1995 |
| $\underline{3Al_2O_3{\cdot}2SiO_2}$ (+ Mo) | 1833-2033 | AlO, $Al_2O$, SiO, $SiO_2$, $\underline{AlSiO}$, $MoO_2$, $MoO_3$, O, $O_2$ | [315]/1994 |
| $xAl_2O_3 + (1-x)SiO_2$, $0.0075 < x < 0.850$ | 1720-2520 | SiO, Al, AlO, O | [316]/2000 |
| $xAl_2O_3 + (1-x)SiO_2$, $0.10 < x < 0.60$ (in W) | 1863-2169 | SiO, $WO_3$, $WO_2$ | [317]/2001 |
| $xAl_2O_3 + (1-x)SiO_2$ (Mo), $0.0119 < x < 0.8414$ | 1676-2327 | SiO, Al, O | [318]/2002<br>[319]/2003<br>[320]/2003 |
| $Al_2O_3$ + SiC+ C + Si | 1350-1750 | Al, $Al_2O$, CO, SiO | [321]/2003<br>[322]/2003 |
| $xMnO + (1-x)SiO_2$, $0.40 < x < 0.80$ | 1369-1817 | Mn, SiO | [323]/1995 |
| $xBaO + (1-x) SiO_2$ $0.2<x<0.6$ | 1838-1990 | SiO, BaO, Ba, $MoO_2$, $MoO_3$, $BaMoO_3$, $BaMoO_4$ | [324]/2006 |
| $\underline{Al_{18}B_4O_{33}} + Al_2O_3$<br>$Al_{18}B_4O_{33} + B_2O_3$ rich liquid<br>$B_2O_3$ rich liquid | 1573-1673<br>1373-1423<br>1373-1423 | $B_2O_3$ | [325]/2009 |
| $SiC+SiO_2$ | < 1650 K | SiO, CO | [326]/2008 |

**Table 6. Summary of Mass Spectrometric Studies on the Metal Halide-Metal Oxide Systems**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|
| $CaO + CaF_2$ | 800-2240 | $CaF_2$, Ca, $O_2$ | [327]/1998 |
| $x_1CaO + x_2SiO_2 + (1-x_1-x_2)CaF_2$ (+ Nb, Ta, Mo) | 1370-1849 | SiF4, SiF2, CaF2, CaF, Ca, SiO, $MO_2$, (M = Nb, Ta, Mo) | [328]/1992<br>[329]/1992 |

**Table 6. contd…**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ref./Year |
|---|---|---|---|
| $x_1CaO+x_2SiO_2+x_3Al_2O_3+(1-x_1-x_2-x_3)CaF_2$ (+Nb, Ta, Mo) | 1370-1836 | $SiF_4$, $SiF_2$, $CaF_2$, CaF, $Al_2F_6$, $AlF_3$, $AlF_2$, AlF, AlOF, Ca, SiO, MO (M = Nb, Ta, Mo) | [330]/1997 |
| CaO + $CaCl_2$ (+ Al, $Al_2O_3$) | 800-2240 | $CaCl_2$, AlOCl, Ca, HCl | [327]/1998 |
| CaO + $CaBr_2$ | 1246 | $CaBr_2$, $Ca_2Br_4$, $Ca_3OBr_4$, $Ca_4OBr_6$ | [331]/1992 |
| CaO + $CaI_2$ | 1048 | $CaI_2$, $Ca_2I_4$, $Ca_3OI_4$, $Ca_4OI_6$ | [331]/1992 |
| $xDy_2O_3 + (1-x)DyF_3$, $0.05 < x < 0.90$ | 1373 | $DyF_3$, DyOF, $Dy_2OF_4$, | [332]/1998 |
| $UO_{2+x}$ + CsI, $0.00 < x < 0.29$ | 600-2300 | $I_2$, CsI, $Cs_2I_2$, Cs, $UO_2$, | [333]/1998 |
| $(AgI)_{0.5}$-$(AgPO_3)_{0.5}$ | 500-650 | I, PO, $P_4O_{10}$, AgI | [334]/2009 |
| $TmX_3$+NaX+$Al_2O_3$ (X=I,Br) | 744-1134 (X=Br)<br>842-1103 (X=I) | NaX, $Na_2X_2$, $TmX_3$, $Tm_2X_6$, $Na_2TmX_5$, $AlX_3$, $NaAlX_4$ | [335]/2005 |
| Mould powders | 373-1823 | NaF, $Na_2F_2$, KF, $SiF_4$, $CaF_2$, $AlF_3$, $MgF_2$, AlOF, Na, SiO, Mg, MgF, $SiF_2$ | [336]/2005 |

**Table 7. Summary of Mass Spectrometric Studies of Fullerens and their Derivatives**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ionisation Properties | Thermodynamic Functions | Ref./Year |
|---|---|---|---|---|---|
| $C_{60}$ | 757 | $C_{60}$ | $C_{60}^+/C_{60}$<br>$C_{60}^{2+}/C_{60}$ | - | [337]/1996 |
| $C_{60}$ | 773-873 | $C_{60}$ | $C_{54}^+/C_{60}$<br>$C_{56}^+/C_{60}$ | - | [338]/1996 |
| $C_{60}$ | 600-800 | $C_{60}$ | $C_{60}^+/C_{60}$ | p(i), $\Delta_{sub}H$ | [339]/1992<br>[340]/1994 |
| $C_{60}$ | | $C_{60}$ | $C_{60}^{k+}$, $C_{58}^{l+}$, $C_{56}^{l+}$, $C_{54}^{l+}$, $C_{50}^{m+}$, $C_{48}^{m+}$, $C_{46}^+$, $C_{44}^+$, k= 1-4, l =1-3, m = 1,2 | | [341]/1996 |
| $C_{70}$ | | $C_{70}$ | $C_{70}^{k+}$, $C_{68}^{k+}$, $C_{66}^{k+}$, $C_{64}^{k+}$, $C_{60}^{k+}$, $C_{62}^{m+}$, $C_{58}^{m+}$, $C_{56}^{n+}$, $C_{54}^{n+}$, $C_{52}^{2+}$, $C_{50}^{2+}$, k= 1-4, m =1-3, n = 2,3 | | [341]/1996 |
| $C_{70}$ | 843 | $C_{70}$ | $C_{70}^+/C_{70}$<br>$C_{70}^{2+}/C_{70}$ | - | [337]/1996 |
| $C_{70}$ | 650-850 | $C_{70}$ | $C_{70}^+/C_{70}$ | - | [342]/1992 |
| $C_{70}$ | 650-850 | $C_{70}$ | - | p(i), $\Delta_{sub}H$ | [343]/1993 |
| $C_{60}$ + $C_{70}$ | 700-840 | $C_{60}$, $C_{70}$ | - | p(i), a(i), $\Delta_{mix}G$ | [344]/1994<br>[340]/1994 |
| $C_{60}$ + $C_{70}$ | 795-1006 | $C_{70+2n}$, n = 0-18 | | electron affinities | [345]/1996 |
| $C_{76}$ | 637-911 | $C_{76}$ | - | p(i), $\Delta_{sub}H$ | [346]/1998 |
| $C_{84}$ | 658-980 | $C_{84}$ | | p(i), $\Delta_{sub}H$ | [347]/1998 |
| $C_n$- mixtures | 886-983 | $C_{2n}$, n = 35-53 | - | $C_{2n} + C_{60}^+ = C_{60} + C_{2n}^+$ | [348]/2000 |
| $C_n$- mixtures | 750-1050 | $C_{70+2n}$, n = 0-18 | - | electron affinities | [345]/1996<br>[349]/1997 |
| $C_n$- mixtures | 700-950 | $C_{76}$, $C_{78}$, $C_{84}$ | | p(i), $\Delta_{sub}H$ | [347]/1998 |
| $C_{60}H_n$, n = 18, 36 | 550-685 | $C_{60}H_n$ | | p(i), $\Delta_{sub}H$ | [350]/2001 |
| $C_{60}F_2$, $C_{70}F_2$ | 650-1070 | $C_{60}F_2$, $C_{70}F_2$, $C_nF_2^-$, n = 60, 70, 72, 74, 76, 78 | | electron affinities | [351]/1994 |

**Table 7. contd…**

| Sample in the Effusion Cell | Temperature Range in K | Gaseous Species | Ionisation Properties | Thermodynamic Functions | Ref./Year |
|---|---|---|---|---|---|
| $C_{60}F_{36}$ | 408-539 | $C_{60}F_{36}$, $C_{60}F_{34}O$ | | p(i), $\Delta_{sub}H$ | [352] [353] |
| $C_{60}F_{48}$ | 395-528 | $C_{60}F_{48}$ | | p(i), $\Delta_{sub}H$ | [352] |
| KF + Gd@$C_n$ | 931-960 | $C_{60}$, $C_{70+2n}$, (n = 0-10), | | electron affinities | [354] |
| $C_{60}$ + $NiF_2$ | 500-800 | $C_{60}$, $C_{60}F_{2n}$, n = 1-23 | | | [355] |
| $C_{60}$ + $BaPbF_6$, $MgPbF_6$, $Na_3PbF_7$, $K_3PbF_7$, $MnF_3$, $CoF_3$ | 500-800 | $C_{60}$, $C_{60}F_n$, n=18-46 | | $\Delta_fH$, kinetics | [356] |
| $C_{60}$/$C_{70}$ + $CrCl_3$, $FeCl_3$, $CuCl_2$ | 520-720 | $C_{60}Cl_{2n}$ (n= 0-9) $C_{70}Cl_{2m}$ (m = 0-7) | | $\Delta_fH$ | [357] |
| K + $C_{60}$ | 560-960 | K, $C_{60}$, K@$C_{60}$ | | $\Delta_fH$, phase diagram | [358] [356] |
| $C_{60}$ +$KMnF_4$, $K_3MnF_6$, $KMnF_5$, $A_2MnF_6$ (A=Li, K, Cs) | 320-480 | $C_{60}$, $C_{60}F_n$ (n = 8, 18,20,36,38,40) | | $C_{60}F_8$ | [359] |
| $C_{60}F_{18}$, $C_{60}F_{36}$, $C_{60}F_{48}$ $C_{60}(CF_3)$n (n = 4-16 ) $C_{60}$+ $K_3PbF_6$, $K_2PtF_6$, $COF_3$ and SFAs | 550-876 | $C_{60}F_n$ (n=8-40) | Different negative ions | electron affinity | [360] |

## REFERENCES


[1] K. Hilpert, and D. Kath, "Investigation of Small Alkali Metall Clusters by Knudsen Effusion Mass Spectrometry Using Broadband Photoionization," *High Temperature Science,* vol. 27, pp. 39-48, 1990.

[2] A.I. Zaitsev, A.D. Litvina, B.M. Mogutnov, I.N. Fridlyander, and N.E. Shelkova, "An Investigation of Evaporation of Lithium," *High Temperature*, vol. 39, pp. 547-551, 2001.

[3] A.I. Zaitsev, A.D. Litvina, B.M. Mogutnov, I.N. Fridlyander, and N.E. Shelkova, "An investigation of evaporation of lithium,"*High Temperature*, vol. 39(4), pp. 507-510, 2001.

[4] J.W. Hastie, D.W. Bonell, and P.K. Schenck, "Development and application of very high temperature mass spectrometry. Vapor pressure determinations over liquid refractories," *Pure Applied Chem*istry, vol. 72(11), pp. 2111-2126, 2000.

[5] T. Tomooka, Y. Shoji, and T. Matsui, "High temperature vapor pressure of Si," *Journal of Mass Spectrometry Society Japan*, vol. 47(1), pp 49-53, 1999.

[6] G. Meloni, and K.A. Gingerich, "Thermodynamic investigationof the Si-7 and Si-8 clusters by Knudsen cell mass spectrometry." *Journal of Chemical Physics*, vol.115, pp. 5470-5476, 2001.

[7] A.I. Zaitsev, and N.E. Zaitseva, "Pressure of the saturated vapor of Nickelat high temperatures," *High Temperature*, vol.40(2), pp. 197-202, 2002.

[8] G. Meloni, M. Sai Baba, and K.A. Gingerich, "Knudsen Cell Mass Spectrometric Investigation of the B2N Molecule," *Journal of Chemical Physics*, vol. 113(20), pp. 8995-8999, 2000.

[9] K.A. Gingerich, M. Sai Baba, R.W. Schmude Jr., and J.E. Kingcade Jr., "Atomization enthalpies and enthalpies of formation of Ge3 and Ge4 by Knudsen effusion mass spectrometry," *Chemical Physiscs*, vol. 262, pp. 65-74, Dec. 2000.

[10] K.A. Gingerich, R.W. Schmude, M. Sai Baba, and G. Meloni, "Atomization Enthalpies and Enthalpies of formation of the Germanium Clusters, Ge5, Ge6, Ge7 and Ge8 by Knudsen Effusion mass Spectrometry," *Journal of Chemical Physics*, vol. 112, pp. 7443-7448, 2000.

[11] Q. Ran, R.W. Schmude, K.A. Gingerich, D.W. Wilhite, and J.E. Kingcade, "Dissociation energy and enthalpy of formation of gaseous silver dimer," *Journal of Chemical Physics*, vol. 97, pp. 8535-8540, 1993.

[12] G. Meloni, R.W. Schmude, J.F. Kingcade, and K.A. Gingerich, "Thermodynamic stability of Sn4, Sn5, Sn6, and Sn7 clusters by Knudsen cell mass spectrometry ," *Journal of Chemical Physics,* vol. 113, pp. 1852-1856, 2000.

[13] A.I. Zaitsev, and B.M. Mogutnov, "The vapor pressures and the heats of sublimation of some rare earth metals," *High Temperature Science*, vol. 28, pp. 331-339, 1990.

[14] Meloni G., Sai Baba M., Gingerich K.A., "Knudsen cell Mass Spectrometric investigation of the B2N molecule," *Journal of Chemical Physics,* vol. 113(20), pp. 8995-8999, 2000.

[15] A. Hartmann, L. Poth, and K.G. Weil, "Gaseous Sodium and Cesium Tellurides and their fragmentation pattern on electron impact ionization," *High Temperature Science*, vol. 31, pp. 121-126, [Physical Abstract], 1991.

[16] G. Balducci, A. Ciccioli, G. Gigli, and L.S. Kudin, "Mass Spectrometric determination of the dissociation energy of the AuMg molecule," *Chemical Physical Letters*, vol. 369, pp. 449-453, 2003.

[17] G. Balducci, G. Gigli, and G. Meloni, "Dissociation energies of the Ga-2, In-2, and GaIn molecules," *Journal of Chemical Physics*, vol. 109, pp. 4384-4388, 1998.

[18] A. Hartmann, K.G. Weil, Ber. Bunsenges. "The vaporization of Cesium/Antimony alloys under equilibrium and nonequilibrium conditions " *Physical Chemistry,* vol. 96, pp. 689-693, 1992.

[19] R. Viswanathan, M. Sai Baba, D.D. Albert Raj, R. Balasubramanian, T.S. Lakshmi Narasimhan, and C.K. Mathews, "A mass spectrometric study of the dissociation of the gaseous diatomic tellurium molecule," *Spectrochim. Acta B*, vol. 49B, pp. 243-250, 1994.

[20] A. Ciccioli, G. Balducci, G. Gigli, L. Perring, and F. Bussy, "Vaporization behaviour and some thermodynamic properties of the Pd-In, Pd-Pb, Pd-Sn systems," *Intermetallics*, vol. 8, pp. 195-201, 2000.

[21] V. Venugopal, S.G. Kulkarni, A.A. Banerjee, G.A. Rama Rao, K.N. Roy, and D.D. Sood, "Determination of partial pressures of Te, Te2, Ag, Ag2, AgTe and Ag2Te gaseous species over Ag(s) + Ag2Te(s) system," *J. Nucl. Mater.*, vol. 238, pp. 218-223, Nov. 1996.

[22] J.P. Nabot, C. Chatillon, *Z. Metallkd*, "Mass spectrometric determination of the atomization energies of the Au2, AuIn, Au2In, AuIn2, Pb2 and AuPb gas molecules", vol. 81, pp. 100-104, [Physical Abstracts], 1990.

[23] R.W. Schmude, and K.A. Gingerich, "Thermodynamic investigation of small germanium-tin clusters with a mass spectrometer," *Journal of Chemical Physics*, vol. 109, pp. 3069-3071, 1998.

[24] G. Meloni, and K.A. Gingerich, "Atomization energies and enthalpies of formation of the SnBi_{n}(n=1-3) gaseous molecules by Knudsen cell mass spectrometry," *Journal of Chemical Physics*, vol. 116, pp. 6957-6960, 2002.

[25] D. Figgen, W. Müller, M. Schweizer, H. Stoll, and K.A. Peterson, "Atomization energies and enthalpies of formation of the SnBin (n=1-3) gaseous molecules by Knudsen cell mass Spectrometry," *Journal of Chemical Physics*, vol. 118(10), pp. 4766-4767, 2003.

[26] G. Meloni, and K.A. Gingerich, "Atomization energies and enthalpies of formation of the SnBin (n=1-3) gaseous molecules by Knudsen cell mass spectroscopy," *Journal of Chemical Physics,* vol. 118(19), pp. 4768, 2003.

[27] G. Meloni, L.M. Thomson, and K.A. Gingerich, "Structure and thermodynamicstability of the OsC and OsC2 molecules by theoretical calculations and by Knudsen cell mass spectrometry," *Journal of Chemical Physics*, vol. 115, pp. 4496-4501, 2001.

[28] H. Woong-Hee, N. Takashi, M. Masao, M. Masafumi, "Measurements of Vapor Pressures of Sc, La, and Ce by Multi-Knudsen Cell Mass Spectrometry," *Metallurgical and Materials Transactions B: Process Metallurgy and Materials Processing Science*, vol. 40B(5), pp. 656-661, 2009.

[29] G. Gigli, M. Giovanni, M. Carrozzino, "Mass spectrometric and computational study of SnPb in the gas phase," *Journal of Chemical Physics*, vol. 122(1), pp. 014303/1-014303/6, 2005.

[30] G.T. Fukuda, P.F. Peterson, D.R. Olander, "Vapor pressure measurements on mixtures of LiF, NaF, and BeF2," IEEE/NPSS Symposium on Fusion Engineering 21st, 324-327, 2006.

[31] K. Nakajima, Y. Nakazono, and Y. Arai, "Vaporization behavior of Pu-Cu intermetallic compounds", *Special Publication-Royal Society of Chemistry*, vol. 305 (Recent Advances in Actinide Science), pp. 448-450, 2006.

[32] A.I. Zaitsev, A.D. Litvina, and N.E Zaitseva, "Thermodynamic properties of hard lithium alloys of aluminum," *Russian Journal of Inorganic Chemistry*, vol. 47(2), pp. 255-259, 2002.

[33] R.A. Andrel, D.D. Jenson, and G.F. Kessinger, "Vaporization properties of the Sn-25 at.%Li alloy," *Journal of Nuclear Material*, vol. 307/311, pp. 739-742, 2001.

[34] A.L. Shilov, L.E. Holappa, and V.L. Stolyarova, "A high temperature mass spectrometric study of the thermodynamic properties of Cu–Mg solid alloys," *Rapid Communications in Mass Spectrometry*, vol. 12, pp. 1133-1136, Sept. 1998.

[35] M. Hino, T. Nagasaka, and R. Takehama, "Activity measurement of the constituents in liquid Cu-Mg and Cu-Ca alloys with mass spectrometry," *Metallurgical Transactions B,* vol. 31B, pp. 927-935, 2000.

[36] N.S. Jacobson, P.B. Brady, G.M. Mehrotra, "Thermodynamics of selected TiAl and Ti-Al-Cr alloys," *Oxidation of Metals*, vol. 52, pp. 537-556, 1999.

[37] K. Hilpert, M. Albers, and D. Kath, "Vaporization studies of Nickel and Titanium Aluminides," In: *Structural Intermetallics* 1997, M.V. Nathal, R. Darolia, C.T. Liu, P.L. Martin, D.B. Miracle, R. Wagner, and M. Yamaguchi, eds., *The Minerals, Metals and Materilas Society*, 1997.

[38] M. Eckert, D. Kath, and K. Hilpert, "Thermodynamic activities in the alloys of the Ti-Al-Nb system " *Metallurgical Transactions A*, vol. 30A, pp. 1315-1326, 1999.

[39] R. Chastel, M. Saito, and C. Bergman, "Thermodynamic investigation on Al1 − xMnx melts by Knudsen cell mass spectrometry," *Journal of Alloys and Compounds*, vol. 205, pp. 39-44, 1994.

[40] R.J. Kematick, and C.E. Myers, "Thermodynamics and phase equilibria in the Al-Mn system," *Journal of Alloys and Compounds*, vol. 178, pp. 343-349, 1992.

[41] N.S. Jacobson, "Twin Knudsen cell configuration for activity measurements by mass spectrometry," *High Temperature Material Sci*ence, vol. 35, pp. 1-9, 1996.

[42] N.S. Jacobson, G.M. Mehrotra, "Thermodynamics of Iron-Aluminum alloys at 1573-K," *Metallurgical Transactions B*, vol. 24B, pp. 481-486, [Physical Abstracts], 1993.

[43] H. Oyamada, T. Nagasaka, and M. Hino, "Activity measurement of the constituents in liquid Cu-Al alloy with Mass-Spectrometry," *Metallurgical Transactions*, vol. 39, pp. 1225-1229, 1998.

[44] K. Hilpert, M. Miller, H. Gerads, and H. Nickel, "Thermodynamic study of liquid and solid alloys of the Nickel-Rich part of the Al-Ni system including the AlNi3-Phase," *Physical Chem*istry, vol. 94, pp. 40-47, 1990.

[45] S.R. Dharwadkar, K. Hilpert, D. Kobertz, V. Venugopal, and H. Nickel, "Differential thermal analysis and knudsen effusion mass spectrometry in the determination of phase equilibrium diagrams in Nickel base superalloys," *High Temperature Science* vol. 28, pp. 203-215, 1990.

[46] M. Albers, D. Kath, and K. Hilpert, "Thermodynamic activities and partial enthalpies of mixing in the solid solution of Fe in Ni3Al," *Metallurgical and Material Transactions A*, vol. 27A, pp. 3569-3575, 1996.

[47] M. Albers, D. Kath, and K. Hilpert, "Thermodynamic activities and phase boundaries for the alloys of the solid solution of Co in Ni3Al," *Metallurgical and Material Transactions A*, vol. 28A, pp. 2183-2188, 1997.

[48] M. Albers, M. Sai Baba, D. Kath, M. Miller, and K. Hilpert, "Chemical activities in the solid solution of Hf in Ni3Al," Berichte der Bunsengesellschaft *Phys. Chem.,* vol. 96, pp. 1663-1668, 1992.

[49] J. Kapala, D. Kath, and K. Hilpert, "Thermodynamic activities and phase boundaries for the alloys of the Ni3Al-Ni3Ti pseudobinary section in the Ni-Al-Ti System," *Metallurgical Transactions A*, vol. 27A, pp. 2673-2677, 1996.

[50] S. Zarembo, R.J. Kematick, C.E. Myers, and E.J. Cotts, "Vaporization thermodynamics and heat capacities of Ti5Ge3 and Ti6Ge5," *Journal of Alloys and Compounds*, vol. 306, pp. 78-86, 2000.

[51] S. Zarembo, R.J. Kematick, and C.E. Myers, "Thermodynamics of phase formation in the V-Ge system," *Journal of Alloys and Compounds*, vol. 299, pp. 126-136, 2000.

[52] S.N. Zarembo, C.E. Myers, R.J. Kematick, P.Y. Zavalij, M.S. Whittingham, and E.J. Cotts, "Vaporization thermodynamics and heat capacities of Cr3Ge and Cr5Ge3," *Journal of Alloys and Compounds*, vol. 329, pp. 97-107, 2001.

[53] A.I. Zaitsev, M.A. Zemchenko, and B.M. Mogutnov, "The thermodynamic properties of iron-chromium alloys. I: experimental study" *Russian Journal of Physical Chemistry*, vol. 64, pp. 634-639, 1990.

[54] A.I. Zaitsev, M.A. Zemchenko, and B.M. Mogutnov, "Thermodynamic properties and phase equilibria at high temperatures in Fe-Cr and Fe-Mn systems," *High Temperature Sci*ence, vol. 28, pp. 313-330, 1989.

[55] J. Tomiska, K. Kopecky, M.S. Belegratis, and C. Myers, "Thermodynamic mixing functions and phase equilibria in the nickel-chromium system by high-temperature knudsen cell mass spectrometry," *Metallurgical Transactions A*, vol. 26A, pp. 259-265, Feb. 1995.

[56] E. Ichise, K. Shaw, and S. Taniguchi, "Thermodynamic study on liquid binary alloys of Co, Cr, and Ni," *Journal of Mass Spectrometry Society of Japan*., vol. 41, pp. 343-350, 1993.

[57] P. Broz, J. Vrestal, and J. Tomiska, "Computer-aided thermodynamics of solid ternary Fe1-x(Ni0.86Cr0.14)x alloys by Knudsen cell Mass Spectrometry," *Physical and Chemical*, vol. 99, pp. 802-806, 1995.

[58] J. Tomiska, and J. Vrestal, "Computation of phase equilibria in the Fe–Ni–Cr system based upon mass spectrometric investigations," *Thermochimica Acta*, vol. 314, pp. 155-167, 1998.

[59] J. Vrestal, J. Theiner, P. Broz, J. Tomiska., "Mass-spectrometric determination of the thermodynamic mixing behavior of liquid ternary Fe–Ni–Cr alloys," *Thermochimica Acta*, vol. 319, pp. 193-200, 1998.

[60] J. Havrankova, J. Vrestal, and J. Tomiska, "Thermodynamics of solid Co-Cr Alloys by Knudsen cell Mass Spectrometry and Compu-tation of the Phase Diagram," *Physical and Chemical*, vol. 102, pp.1225-1230, 1998.

[61] J. Havrankova, J. Vrestal, and J. Tomiska, "Mass-spectrometric determination of thermodynamic properties of liquid Co-Cr alloys" *Kovove Mater*., vol. 37, pp. 34-41, 1999.

[62] J. Vrest`al., J. Stepankova, and P. Broz, "Thermodynamics of the Copper-Manganese System. Knudsen-cell Mass Spectrometric Study of the Liquid Cu-Mn System and Calculation of the Phase Diagram," *Scandinavian Journal of Metallurgy*, vol. 25, pp. 224-231, 1996.

[63] T.S. Lakshmi Narasimhan, M. Sai Baba, R. Balasubramanian, S. Nalini, and R. Viswanathan, "Vaporization studies on (manganese + tellurium) withx(Te) > 0.5 by Knudsen effusion mass spectrometry," *Journal of Chemical Thermodynamics*, vol. 34, pp. 103-117, 2002.

[64] A.I. Zaitsev, N.E. Shelkova, A.D. Litvina, E.Kh.Shakhpazov, B.M. Mogutnov, "An investigation of evaporation of liquid alloys of Iron with Copper," *High Temperature*, vol. 39, pp. 416-423, 2001

[65] T. Matsui, "Vaporization study on M2Zr (M = FeandCr) by a mass-spectrometric method " *Journal of Nuclear Material*, vol. 201, pp. 278-283, 1993.

[66] J. Tomiska, K. Kopecky, M.S. Belegratis, and A. Neckel, "Thermodynamic excess quantities of solid ternary Fexnixco1-2x alloys by computer-aided Knudsen cell mass-spectrometry," *Zeitschrift fur Metallkunde*, vol. 84, pp. 619-621, 1993.

[67] J. Tomiska, M.S. Belegratis, K. Kopecky, and A. Neckel, "Thermodynamics of liquid ternary FexNixCo1–2x alloys by computer-aided Knudsen cell mass spectrometry," *Journal of Non-Crystalline Solids*, vol. 156-158, pp. 425-428, May 1993.

[68] Y. Fujita, R.U. Pagador, M. Hino, T. Azakami, "Thermodynamic investigation on molten Cu—Ni—Fe alloys by the double Knudsen Cell-Mass Spectrometer system" *Journal of the Japan Institute of Metals,* vol. 61, pp. 619-624, [Physical Abstracts], 1997.

[69] A.I. Zaitsev, and N.E. Zaitseva, "Thermodynamic properties of intermediate phases and solid solutions in the Ni-Zr system," *Russian Journal of Inorganic Chemistry,* vol. 48(2), pp. 257-262, 2003.

[70] A.I. Zaitsev, N.E. Zaitseva, E.Kh. Shakhpazov, and A.A. Kodentsov, "Thermodynamic properties and phase equilibria in the nickel-zirconium system. The liquid to amorphous state transition," *Physical Chemistry Chemical Physics*, vol. 4, pp. 6047-6058, 2002.

[71] S. Brutti, A. Ciccioli, G. Balducci, G. Gigli, G. Borzone, R. Raggio, and R. Ferro, "Thermodynamics of the Ni-Yb system," *Journal of Phase Equilibria*, vol. 23, pp. 51-56, 2002.

[72] A.I. Zaitsev, and N.E. Zaitseva, "The thermodynamic properties of intermetallic compounds and solid solutions of Cu-Zr System," *High Temperature*, vol. 41(1), pp. 49-56, 2003.

[73] M. Miller, and K.A. Gingerich, "Thermodynamics of the liquid {xCu +yAu + (1 −x −y)Ge}, (0.75 ≤x ≤ 1, 0 ≤y ≤ 0.125) alloys at 1550 K by Knudsen effusion mass spectrometry," *Metallurgical and Material Transactions A*, vol. 25A, pp. 857-864, 1994.

[74] E. Oktay, "The thermodynamic activities of Silver in liquid Silver-Copper-Germanium alloys," *Zeitschrift fur Metallkunde*, vol. 85, pp. 824-827, 1994.

[75] S. Chatain, C. Gonella, G. Bordier, and J. Le Ny, "Thermodynamic activity measurements of the liquid Cu-Gd alloy by high temperature mass spectrometry," *Journal of Alloys and Compounds*, vol. 228, pp.112-118, 1995.

[76] Y. Ueda, K. Maekawa, T. Oishi, and K. Ono, "Thermodynamic Study of Cu-Nd Alloys by Mass Spectrometry " *Journal of Mass. Spectrometry Society of Japan*, vol. 41, pp. 351-357, 1993.

[77] A.S. Alikhanian, V.N. Guskov, A.M. Natarovsky, J.H. Greenberg, M. Fiederle, and K.W. Benz, "Mass spectrometric study of the CdTe-ZnTe system," *Journal of Crystal Growth*, vol. 240, pp. 73-79, April 2002.

[78] A.S. Alikhanian, V.N. Guskov, A.M. Natarovskii, and V.V. Kovalenko, "Thermodynamic Properties of ZnTe–CdTe Solid Solutions," *Inorganic Materials*, vol. 39(3), pp. 234-239, March 2003.

[79] J.H. Greenberg, V.N. Guskov, and A.S. Alikhanian, "Solid–vapor equilibrium in quasi-binary CdTe—ZnTe," *Crystal Research and Technology*, vol. 38(7-8), pp. 598-603, 2003.

[80] M.V. Molchanov, A.S. Alikhanyan, V.P. Zlomanov, and L.V. Yashina, "Mass spectrometric study of vapor composition over germanium telluride," *Inorganic Material*, vol. 38(6), pp. 55-563, 2002.

[81] R. Viswanathan, M. Sai Baba, T.S. Lakshmi Narasimhan, R. Balasubramanian, D. Darwin Albert Raj, and C.K. Mathews, "Homogeneity ranges and thermodynamic properties of the Te-rich phases in the Cr-Te system," *Journal of Alloys and Compounds*, vol. 206, pp.201-210, [Phys. Abstr.], 1994.

[82] M. Sai Baba, R. Viswanathan, and C.K. Mathews, "Thermodynamic and phase diagram studies on Metal-Tellurium systems employing Knudsen effusion mass spectrometry," *Rapid Communication in Mass Spectrometry*, vol. 10, pp. 691-698, 1996.

[83] J. Kubista, and J. Vrestal, "Thermodynamics of the liquid Co-Cu system and calculation of phase diagram," *Journal of Phase Equilibria*, vol. 21, pp. 125-129, 2000.

[84] V.P. Zlomanov, M.S. Sheiman, V.N. Demin, and B. Legendre, "Phase diagram and thermodynamic properties of phases in the In-Te system," *Journal of Phase Equilibria*, vol. 22(3), pp. 339-344, 2001.

[85] T.S. Lakshmi Narasimhan, R. Viswanathan, and R. Balasubramanian, "Congruent vaporization of solid Manganese Monotelluride and the Effects of Phase Transitions: a high-temperature Mass Spectrometric study," *Journal of Physical Chemistry B*, vol. 102, pp. 10586-10595, 1998.

[86] A. Yassin, R. Chastel, and R. Castanet, "Determination of the Free Enthalpy of Formation of the Au-Te Melts by Knudsen-Cell Effusion Combined with a Mass-Spectrometer," *Physics and Chemistry of Liquids*, vol. 34, pp. 65-75, [Chemical Abstracts], 1997.

[87] R. Viswanathan, D.D. Raj, T.S. Lakshmi Narasimhan, R. Balasubramanian, and C.K. Mathews, "Study of (molybdenum + tellurium) by Knudsen-effusion mass spectrometry," *Journal of Chemical Thermodynamics*, vol. 25, pp. 533-547, 1993.

[88] G. Balducci, A. Ciccioli, G. Gigli, D. Gozzi, and U. Anselmi-Tamburini, "Thermodynamic study of intermetallic phases in the Hf&z.sbnd;Al system," *Journal of Alloys and Compounds*, vol. 220, pp. 117-121, April 1995.

[89] L. Bencze, K. Hilpert, "Thermochemistry of the Ni-Hf System – Intermetallic Phases," *Metallurgical Transactions A* , vol. 27A, pp. 3576-3590, 1996.

[90] Stolen S., Matsui T., Naito K., "Mass spectrometric vaporization study on palladium-zirconium alloys," *Journal of Nuclear Materials*, vol. 173, pp. 48-58, 1990.

[91] M.J. Stickney, M.S. Chandrasekharaiah, K.A. Gingerich, and J.A. Speed, "Thermodynamic stability of palladium alloys: Part I: The palladium-niobium system," *Metallurgical Transactions A*, vol. 22A, pp. 1937-1943, Sept. 1991.

[92] A. Ciccioli, G. Balducci, G. Gigli, L. Perring, J.J. Kuntz, and J.C. Gachon, "Thermodynamic study of intermetallic phases in the Ru-Ge, Ru-Sn and Ru-Si systems by Knudsen cell Mass Spectrometry," *Physical and Chemical*, vol. 102, pp. 1275-1278, 1998.

[93] H. Bittermann, K. Kopecky, J. Tomiska, "Thermodynamics of liquid nickel-palladium alloys by computer-aided knudsen cell mass spectrometry," *Journal of Alloys and Compounds*, vol. 196, pp. 53-57, 1993.

[94] K. Kopecky, M.S. Belegratis, A. Neckel, and J. Tomiska, "Computerunterstützte thermodynamik fester Ni-Pd legierungen über die Knudsenzellen-Massenspektrometrie und Berechnung des Zustandsdiagrammes," *Physical and Chemical*, vol. 96, pp. 1658-1662, 1992.

[95] H. Wang, M.S. Belegratis, J. Theiner, and J. Tomiska, "Computer-aided thermodynamic study of solid Cobalt-Palladium alloys by Knudsen cell mass spectrometry, and calculation of the phase diagram," *Journal of Alloys and Compounds*, vol. 220, pp. 32-38, April 1995.

[96] J. Tomiska, K. Kopecky, and A. Neckel, "Computerunterstützte Knudsenzellen-Massenspektrometrie: Die thermodynamischen Mischungsfunktionen flüssiger Gold-Palladium-Legierungen," *Berichte der Bunsengesellschaft für physikalische Chemie*, vol. 94, pp. 47-52, Jan. 1990.

[97] J. Tomiska, "Computer-aided thermodynamics of solid gold-palladium alloys by Knudsen cell mass spectrometry and calculation of the phase diagram", *Zeitschrift für Metallkunde,* vol. 81, pp. 912-918, 1990.
[98] R. Chastel, R. Lbibb, and R. Castanet, "Thermodynamic investigation of ternary Pt–Pd–Ge alloys by Knudsen effusion combined with mass spectrometry," *Journal of Alloys and Compounds*, vol. 283, pp. 208-212, Feb. 1999.
[99] T. Miki, N. Ogawa, T. Nagasaka, and M. Hino, "Activity measurement of the constituents in molten Ag-In-Sn ternary alloy by Mass Spectrometry," *Material Transactions*, vol. 42(5), pp. 732-738, 2001.
[100] Y. Shoji, T. Matsui, T. Nagasaki, M. Kurata, and T. Inoue, "Vapor Pressure Measurements of Lanthanum–Bismuth Alloys by Mass-Spectrometric Method," *International Journal of Thermophysics*, vol. 21, pp. 585-591, March 2000.
[101] Y. Shoji, T. Matsui, K. Nakamura, and T. Inoue, "Vaporization study on lanthanum–cerium alloys by mass-spectrometric method," *Journal of Nuclear Material*, vol. 254, pp. 9-13, March 1998.
[102] Y. Shoji, and T. Matsui, "Vaporization study on lanthanum–neodymium alloys by mass-spectrometry," *Journal of Nuclear Material*, vol. 273, pp. 310-314, Aug. 1999.
[103] Y. Shoji, T. Matsui, K. Nakamura, and T. Inoue, "Vapor pressure measurements of La□Gd alloys," *Journal of Nuclear Material*, vol. 247, pp. 37-40, Aug. 1997.
[104] Y. Shoji, T. Matsui, K. Nakamura, and T. Inoue, "Vaporization study on lanthanum–uranium and cerium–uranium alloys by mass-spectrometric method," *Journal of Nuclear Material*, vol. 265, pp. 134-138, Feb. 1999.
[105] P. Gardie, G. Bordier, J.J. Poupeau, and J. Le Ny, "Thermodynamic activity measurements of U-Fe and U-Ga alloys by mass spectrometry," *Journal of Nuclear Material*, vol. 189, pp. 85-96, July 1992.
[106] S. Kurosawa, T. Oka, M. Yasumoto, S. Ueta, N. Morioka, N. Komada, and M. Yamawaki, "Thermodynamic study of a U-Fe alloy by means of Knudsen effusion mass spectrometry," *Journal of Mass Spectrometry Social Japan.*, vol. 41, pp. 329-334, 1993.
[107] A. Maeda, Y. Suzuki, and T. Ohmichi, "Uranium activity of uranium-rich uranium-zirconium alloys by Knudsen effusion mass spectrometry," *Journal of Alloys and Compounds*, vol. 179, pp. L21-L24, 1992.
[108] A. Maeda, Y. Suzuki, Y. Okamoto, and T. Ohmichi, "Vaporization behavior of plutonium-zirconium binary alloy,"*Journal of Alloys and Compounds*, vol. 205, pp. 35-38, 1994.
[109] Hilpert K., Miller M., *Z. Metallkd*., vol. 83, pp. 739-743, 1992.
[110] M.C.Y. Lee, "The effect of Mn on the activities of Fe, Ni, and Cr in an Fe-Ni-Cr base alloy," *Metallurgical Transactions A*, vol. 24A, pp. 2379-2382, Nov. 1993.
[111] V. Venugopal, S.G. Kulkarni, C.S. Subbanna, D.D.Sood, "Determination of chemical activities of Fe, Cr, Ni and Mn in stainless steel 316 by Knudsen effusion cell mass spectrometry," *Journal of Alloys and Compounds*, vol. 218, pp. 95-100, 1995.
[112] C.A.Alexander, J.S. Ogden, "Thermodynamic activities in Zircaloy-4 by Mass-Spectrometry," *Journal of Nuclear Material,* vol. 175, pp. 197-202, 1990.
[113] A.I. Zaitsev, N.E. Zaitseva, V.V. Maltsev, N.A. Arutyunyan, and S.F. Dunaev, "Thermodynamics and Amorphization of Nickel-Lanthanum Melts," *Doklady Physical Chemistry*, vol. 402(1), pp.76-79, 2005.
[114] A.I. Zaitsev, N.E. Zaitseva, E.Kh. Shakhpazov, N.A. Arutyunyan, and S.F. Dunaev, "Thermodynamic investigation of quasicrystal-forming Al-Mn melts," *Doklady Physical Chemistry* , vol. 406(1), pp. 5-8, Jan. 2006.
[115] L. Bencze, T. Markus, S. Dash, D.D. Raj, D. Kath, W.A. Oates, W. Loser, and K. Hilpert, "Thermodynamic properties of B2-AlFeNi alloys Part I: investigation by knudsen effusion mass spectrometry," *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science,* vol. 37A (11), pp. 3171-3181, 2006.
[116] A.I. Zaitsev, R.Yu. Shimko, N.A. Arutyunyan, and S.F. Dunaev, "A study of thermodynamic properties and association in the Al-Cu melt and their relation to quasicrystal formation conditions," *Doklady Physical Chemistry*, vol. 414(1), pp. 115-119, 2007.
[117] A.I. Zaitsev, N.E. Zaitseva, N.A. Arutyunyan, and S.F. Dunaev, "Thermodynamics and amorphization of the nickel–lanthanum alloys" *Chemical Engineering Communications*, vol. 194(12), pp. 1579-1595, 2007.
[118] S. Gosse, T. Alpettaz, F. Rouillard, S. Chatain, C. Gueneau, C. Cabet, "Direct measurements of the chromium activity in the comples nickel base alloys by high temperature mass spectrometry" *Materials Science Forum*, 595-598(Pt. 2, *High Temperature Corrosion and Protection of Materials* 7, Part 2), 975-985, 2008.
[119] A.I. Zaitsev, N.E. Zaitseva, R.Yu. Shimko, N.A. Arutyunyan, S.F. Dunaev, V.S. Kraposhin, and H.T. Lam, "Thermodynamic properties of Al-Mn, Al-Cu, and Al-Fe-Cu melts and their relations to liquid and quasicrystal structure," *Journal of Physics: Condensed Matter* , vol. 20(11), pp. 114121/1-114121/4, 2008.
[120] A. Popovic, O. Semenova, K. Richter, R. Krachler, G. Bester, and H. Ipser, "Thermodynamics and nonstoichiometry in the D03 compound Ni3Sb," *Intermetallics*, vol. 15(7), pp. 862-868, 2007.
[121] G. Balducci, S. Brutti, A. Ciccioli, G. Gigli, A. Palenzona, and M. Pani, "Energetics and thermodynamic stability of the mixed valence ytterbium germanides," *The Journal of Physical Chemistry B*, vol. 111(19), pp. 5132-9, 2007.
[122] S. Chatain, C. Gueneau, C. Chatillon, "High temperature mass spectrometry: Application to the thermodynamic study of the Fe-Zr system" *Journal of Nuclear Materials*, vol. 344(1-3), pp. 281-28, 2005.
[123] A. Popovic, and L. Bencze, "Mass spectrometric determination of ternary interaction parameters of liquid Cu–In–Sn alloy," *International Journal of Mass* Spectrometry, vol. 257(1-3), pp. 41-49, 2006.
[124] A.I. Zaitsev, N.E. Zaitseva, N.A. Arutyunyan, and S.F. Dunaev, "Thermodynamic properties and phase equilibria in the Nickle-Lanthanam system: Transition of melts into the amorphous state," *Russian Journal of Physical Chemistry*, vol. 80(5), pp. 678-688, 2006.
[125] A.I. Zaitsev, N.E. Zaitseva, E.Kh. Shakhpazov, N.A. Arutyunyan, S.F. Dunaev, "The conditions of formation and stability of Quasi-Crystalline phases in Aluminum-Manganese alloys," *Russian Journal of Physical Chemistry*, vol. 80(6), pp. 869-877, 2006.
[126] L. Bencze, and A. Popovic, "Knudsen effusion mass spectrometric determination of mixing thermodynamic data of liquid Ag–In–Sn alloy," *International Journal of Mass Spectrometry*, vol. 270(3), pp. 139-155, March 2008.
[127] A.I. Zaitsev, N.E. Zaitseva, N.A. Arutyunyan, and B.M. Mogutnov, "Thermodynamic Study of Liquid, Crystalline and Quasi-Crystalline Al-Mn Phases," *Journal of Phase Equilibria and Diffusion*, vol. 29(1), pp.20-29, 2008.
[128] S. Chatain, B. Larousse, C. Maillault, C. Gueneau, and C. Chatillon, "Thermodynamic activity measurements of iron in Fe–Zr alloys by high temperature mass spectrometry," *Journal of Alloys and Compounds*, vol. 457(1-2), pp. 157-163, June 2008.
[129] U. Bardi, F. Niccolai, M. Tosti, and A. Tolstogouzov, "Gold assay with Knudsen effusion mass spectrometry," *International Journal of Mass Spectrometry,*vol. 273(3), pp. 138-144, June 2008.
[130] M.H.G. Jacobs, R. Schmid-Fetzer, T. Markus, V. Motalov, G. Borchardt, and K.H. Spitzer, "Thermodynamics and diffusion in ternary Fe–Al–Cr alloys, Part I: Thermodynamic modeling," *Intermetallics*, vol. 16(8), pp. 995-1005, Aug. 2008.
[131] J. Tomiska, "Ternary thermodynamics by computer-aided Knudsen cell mass spectrometry: Bcc solid ternary Fe–Co–Cr alloys," *Journal of Alloys and Compounds*, vol. 485(1-2), pp. 150-155, Oct. 2009.
[132] J. Tomiska, "Computer-aided thermodynamics of fcc solid ternary Fe–Co–Cr alloys by Knudsen cell mass spectrometry," *CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry*, vol. 33(3), pp.599-604, Sept. 2009.
[133] J. Tomiska, "Thermodynamic excess quantities of ternary Au–Co–Pd melts by computer-aided Knudsen cell mass spectrometry," *Thermochimica Acta*, vol. 495(1-2), pp. 22-27, Nov. 2009.

[134] S. Brutti, G. Balducci, and G. Gigli, "A gas-inlet system coupled with a Knudsen cell mass spectrometer for high-temperature studies," *Rapid communications in mass spectrometry : RCM*, vol. 21(2), pp.89-98, Jan. 2007.

[135] T.S.L. Narasimhan, D. Kath, T. Markus, and K. Hilpert, "Activity measurements on the Al-rich region of the Ni-Al system - a high temperature mass spectrometric study," *International Journal of Materials Research*, vol. 97(4), pp.461-470, Apr. 2006.

[136] T.S.L. Narasimhan, D. Kath, E. Wessel, T. Markus, and K. Hilpert, "Knudsen effusion mass spectrometric studies of the Al–Ni system: Thermodynamic properties over {AlNi + Al3Ni2} and {Al3Ni2 + Al3Ni}," *International Journal of Materials Research*, vol. 97(6), pp. 802-807, 2006.

[137] A.I. Zaitsev, and A.A. Kodentsov, "Thermodynamic properties and phase equilibria in the Si-B system," *J. Phase Equilibria*, vol.22(2), pp.126-135, April 2001.

[138] S. Brutti, A. Ciccioli, G. Balducci, G. Gigli, P. Manfrinetti, and A. Palenzona, "Vaporization Thermodynamics of MgB2 and MgB4," *Applied Physics Letters*, vol. 80, pp. 2892-2894, 2002.

[139] A.I. Zaitsev, A.D. Litvina, and N.E. Shelkova, "Thermodynamic Properties of Si–P Melts," *High Temperature*, vol. 39(2), pp. 227-232, March 2001.

[140] S. Brutti, A. Ciccioli, G. Balducci, G. Gigli, P. Manfrinetti, and M. Napoletano, "Thermodynamics stabilities of intermediate phases in the Ca-Si system," *Journal of Alloys and Compounds*, vol. 317-318, pp. 525-531, 2001.

[141] S.H. Tabaian, M. Maeda, T. Ikeda, Y. Ogasawara, "Thermodynamic study of molten Si-Ti binary alloys," *High Temperature Mater. Proc.*, vol. 19, pp. 257-264, 2000.

[142] A.I. Zaitsev, N.E. Shelkova, A.D. Litvina, and B.M. Mogutnov, "Thermodynamic properties and phase equilibria in the Cr-P system," *Journal of Phase Equilibria*, vol. 19, pp. 191-199, 1998.

[143] A.I. Zaitsev, A.D. Litvina, N.E. Shelkova, and B.M. Mogutnov, "Association in ternary metallic melts Fe-Mn-Si, Fe-Cr-P and Fe-Mn-P," *Thermochimica Acta*, vol. 314, pp. 307-315, April 1998.

[144] A.I. Zaitsev, N.E. Shelkova, and B.M. Mogutnov, "Thermodynamic properties of the Fe-Cr-P liquid solution," *Metallurgical and Materials Transactions B*, vol. 29B, pp. 155-161, 1998.

[145] A.I. Zaitsev, N.E. Zaitseva, "The Thermodynamic Properties of Melts and Phase Equilibria in the Iron-Boron System. Transition of liquid Fe-B Melts into the amorphous state" *Russian Journal of Physical Chemistry*, vol. 76, pp. 24-34, 2002.

[146] A. I. Zaitsev, "The thermodynamic properties of Iron Borides", *Russian Journal of Physical Chemistry*, vol. 75, pp. 1594-1597, 2001.

[147] A.I. Zaitsev, and N.E. Zaitseva, "Thermodynamic properties and phase equilibria in the iron–boron system. Transition of the Fe–B melt into the amorphous state," *Journal of Materials Chemistry*, vol. 13, pp. 943-950, 2003.

[148] J. Botor, A. Zajaczkowski, L. Dziewidek, G.H. Siderov, "The arsenic activity in the Liquid Fe-As alloys," *Zeitschrift für Metallkunde*, vol. 82, pp. 304-309, 1991.

[149] D.G. Mendoza, M. Hino, and K. Itagaki, "Phase relations and activity of Arsenic in Cu-Fe-S-As system at 1473 K," *Materials Transactions, The Japanese Institute of Metals, I.M.*, vol. 42(11), pp. 2427-2433, 2001.

[150] A.I. Zaitsev, N.E. Zaitseva, and E.Kh. Shakhpazov, "Thermodynamic properties of intermediate Ni–P Phases (26–32.5 at. % P) between 971 and 1440 K," *Inorganic Materials*, vol. 39(5), pp. 427-432, 2003.

[151] A.N. Golov, G.P. Miroevskii, L.Sh. Tsemekhman, L.A. Pavlinova, S.I. Lopatin, "A study of Cu-Ni-S melt evaporation by high-temperature Mass-Spectrometry," *The Russian Journal of Applied Chemistry*, vol. 73(12), pp. 2025-2028, 2000.

[152] A. Zakeri, M. Hino, and K. Itagaki, "Activity of silver in molten copper sulfide saturated with copper," *Materials Transactions JIM,* vol. 39, pp.1101-1107, 1998.

[153] C. Bergman, R. Chastel, and J.C. Mathieu, "Determination of the thermodynamic properties of (gold+copper+silicon) melts by Knudsen-cell mass spectrometry," *Thermochimica Acta*, vol. 314, pp. 169-173, April 1998.

[154] C. Bergman, R. Chastel, and R. Castanet, "Thermodynamic investigation on the si-ge binary system by calorimetry and knudsen cell mass spectrometry," *Journal of Phase Equilibria*, vol.13, pp. 113-118, April 1992.

[155] A. Palenzona, P. Manfrinetti, S. Brutti, and G. Balducci, "The phase diagram of the Yb–Si system," *Journal of Alloys and Compounds*, vol. 348, pp. 100-104, 2003.

[156] S. Brutti, G. Balducci, A. Ciccioli, and G. Gigli, "Thermodynamic assessment of the Yb–Si system," *CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry*, vol. 29(3), pp. 254-261, 2005.

[157] T. Nagai, M. Miyake, H. Kimura, and M. Maeda, "Determination of Gibbs free energy of formation of Cr3P by double Knudsen cell mass spectrometry," *Journal of Chemical Thermodynamics*, vol. 40(3), pp. 471-475, March 2008.

[158] T. Noda, K. Oikawa, S. Itoh, M. Hino, T. Nagasaka, "Thermodynamic evaluation of Cu-Cu3P system based on newly determined Gibbs energy of formation of Cu3P," *CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry*, vol. 33(3), pp.557-560, 2009.

[159] G. Balducci, S. Brutti, A. Ciccioli, G. Gigli, P. Manfrinetti, A. Palenzona, M.F. Butman, and L. Kudin, "Thermodynamics of the intermediate phases in the Mg-B system," *Journal of Physics and Chemistry of Solids*, vol. 66(2-4), pp. 292-297, 2005.

[160] K. Itagaki, D. G. Mendoza, L.Voisin, M. Hino, "Activity of arsenic in liquid Cu-Fe base alloys," *Monatshefte fuer Chemie*, vol. 136(11), pp. 1847-1852, 2005.

[161] G. Balducci, S. Brutti, A. Ciccioli, G. Gigli, G. Trionfetti, A. Palenzona, and M. Pani, "Vapor pressures and thermodynamic properties of strontium silicides," *Intermetallics*, vol. 14(5), pp. 578-583, 2006.

[162] T. Nagai, M. Miyake, Y. Mitsuda, H. Kimura, and M. Maeda, "Mass Spectrometric Study on Phosphorus in Molten Carbon-saturated Iron," *ISIJ International*, vol. 47(2), pp. 207-210, 2007.

[163] G. Balducci, S. Brutti, A. Ciccioli, G. Trionfetti, A. Palenzona, and M. Pani, "Thermodynamic properties of barium silicides from vapour pressure measurements and density functional calculations," *Intermetallics*, vol. 16(8), pp 1006-1012, 2008.

[164] A. Ciccioli, G. Gigli, and G. Meloni, "The SiSn chemical bond: an integrated thermochemical and quantum mechanical study of the SiSn diatomic molecule and small Si–Sn clusters," *Chemistry - A European Journal*, vol. 15(37), pp. 9543-9560, Sept. 2009.

[165] D.L. Hildenbrand, and K.H. Lau, "Mass spectrum and sublimation pressure of sodium oxide vapor: Stability of the superoxide molecule NaO2," *The Journal of Chemical Physics*, vol. 98, pp. 4076-4081, March 1993.

[166] J.L. Vassent, A. Marty, B. Gilles, and C. Chatillon, "Thermodynamic analysis of molecular beam epitaxy of MgO(s) I. MgO vaporization by electron bombardment," *Journal of Crystalline Growth*, vol. 219, pp. 434-443, Nov. 2000.

[167] D.H. Peck, M. Miller, and K. Hilpert, "Vaporization and thermodynamics of the MgO–Cr2O3–La2O3 system investigated by Knudsen effusion mass spectrometry," *Solid State Ionics*, vol. 147, pp. 29-40, 2002.

[168] G.A. Semenov, "The thermodynamic properties of gaseous Barium Germanate BaGeO2 according to high-temperature mass Spectrometry data," *The Russian Journal of Applied Chemistry*, vol. 70, pp. 924-925, 1996.

[169] G.F. Kessinger, P.W. Gilles, "The high temperature vaporization and thermodynamics of the Titanium Oxides (XVIII)" *High Temperature Science*, vol. 26, pp. 355-363, 1990.

[170] T.S. Lakshmi Narasimhan, R. Balasubramanian, S. Nalini, M. Sai Baba, "Vaporization studies on tellurium dioxide: a Knudsen effusion mass spectrometric study," *Journal of Nuclear Materials*, vol. 247, pp. 28-32, 1997.

[171] A. Hackert, and R. Gruehn, "Zur Bedeutung von V2O3(OH)4(g) für den chemischen Transport von V2O5(s) in Anwesenheit von Wasser. Nachweis des Gasteilchens, thermodynamische Daten und Modellrechnungen," *Zeitschrift für anorganische und allgemeine Chemie*, vol. 624. pp. 1756-1762, 1998.

[172] L.R. Watson, T.L. Thiem, R.A. Dressler, R.M. Salter, and E. Murad, "High temperature mass Spectrometric studies of the bond energies of Gas-Phase ZnO, NiO and CuO," *Journal of Physical Chemistry*, vol. 97, pp. 5577-5580, 1993.

[173] A.V. Makarov, S.G. Zbezhneva, V.V. Kovalenko, M.N. Rumyantseva, "Mass Spectrometric study of nanocrystaline ZnO vaporization," *Inorganic Materials*, vol. 39(6), pp. 705-709, 2003.

[174] S.G. Zbezhneva, A.V. Makarov. "Mass-spectroscopic investigation of vapors over nanocrystalline zinc oxide," *Vestn Mosk Univ Ser Khim*, vol 43(3), pp. 143, 2002.

[175] A. Ait-Hou, T. Rais, C. Chatillon, M. Allibert, "Thermodynamique de la Vaporisation du Systeme Cuivre-Oxygene par Spectrometrie de Masse" *Annales de chimie* , vol 20, pp. 345-354, [Chemical Abstract], 1995.

[176] D.L. Hildenbrand, K.H. Lau, "Dissociation energy of the PdO molecule," *Chemical Physics Letters*, vol 319, pp. 95-98, 2000.

[177] J.K. Gibson, "High-Temperature oxide and hydroxide vapor species of technetium," *Radiochimica Acta,* vol.60, pp.121-126, 1993.

[178] E. Zimmermann, S. Koenigs, D. Neuschuetz, "Mass Spectrometric determination of the partial pressures of SnO, Sn2O2, and O2 in equilibrium with solid SnO2," *Zeitschrift für Physikalische Chemie (Munich)*, vol. 209, pp. 271-280, 1999.

[179] E. Zimmermann, S. Koenigs, D. Neuschuetz, "Determination by Mass Spectrometry of the partial pressures of SnO, Sn2O2, Sn4O4 and Sn6O6 in equilibrium with Oxygen saturated Tin melts" *Zeitschrift für Physikalische Chemie (Munich)*, vol 193, pp. 195-206, 1996.

[180] K.N. Marushkin, V.B. Kalinin, A.S. Alikhanyan, "Mass Spectrometric study of vapor composition over the Ce-O system", *Inorganic Materials*, vol. 36(8), pp.793-798, 2000.

[181] O. Knacke, and A. Richthofen, "Oligomerization of PbO-Vapor," *Journal of Physical Chemistry*, vol. 187, pp. 257-264, 1994.

[182] A. Popovic, A. Lesar, M. Gucek, and L. Bencze, "Investigation of the evaporation properties of Lead Oxide," *Rapid Communication and Mass Spectrometry*, vol. 11, pp. 459-468, 1997.

[183] E. Oniyama, P.G. Wahlbeck, "Phase equilibria in the Bismuth-Oxygen systems", *Journal of Physical Chemistry B*, vol. 102, pp. 4418-4425, 1998.

[184] K. Nakajima, and Y. Arai, "Investigation of vaporization behavior of hyper-stoichiometric uranium dioxide by Knudsen effusion mass spectrometry,"*Journal of Nuclear Material*, vol. 317, pp. 243-251, 2003.

[185] M. Baichi, C. Chatillon, C. Gueneau, J. Le Ny, "Mass spectrometric study of the oxygen potential at the UO2-x-U(l) phase limit," *Journal of Nuclear Material*, vol. 303, pp. 196-199, 2002.

[186] K. Nakajima, Y. Arai, "Mass-spectrometric investigation of UO3(g)," *Journal of Nuclear Material*, vol. 294, pp. 250-255, 2001.

[187] M. Guido, and G. Balducci," Identyfication and stability of U2O2, U2O3, and U2O, gaseous oxides molecules," *Journal of Nuclear Material*, vol. 95, pp. 5373-5376, 1991.

[188] C. Ronchi, F. Capone, J.Y. Colle, and J.P. Hiernaut, "Volatile molecule PuO3 observed from subliming plutonium Dioxide," *Journal of Nuclear Material*, vol. 280, pp. 111-115, 2000.

[189] A. Suzuki, M. Yamawaki, M. Yasumoto, and K. Yamaguchi, "Study on the sweep gas chemistry effect on vaporization behavior of Li2TiO3 by means of HT mass spectrometry," *Journal of Nuclear Material*, vol. 248, pp. 111-115, 1997.

[190] A. Suzuki, K. Yamaguchi, T. Terai, and M. Yamawaki, "Application of high temperature mass spectrometry and work function measurement to evaluation of thermochemical performance of ceramic breeders," *Fusion Engineering and Design*, vol. 49-50, pp. 681-688, 2000.

[191] T, Hoshino M. Yasumoto, Y. Takahashi, T. Terai, and M. Yamawaki, Hydrogen Atmosphere Effect on vaporization of Li2TiO3 by means of high temperature Mass Spectrometry" *Journal of the Mass Spectrometry Society of Japan*., vol. 51(1), pp. 163-167, 2003.

[192] A.M. Pogrebnoi, L.S. Kudin, and L.S. Krasnov, "Mass-Spektrometrichesko'ie issledovan'ie nieitralnych I ionnych kompon'entov para nad twierdymi elektrolitami $Li_4TiP_2O_9$ I $Na_4TiP_2O_9$," *Zhurnal Fizicheskoi Khimii*, vol. 71, pp. 210-215, 1997.

[193] L.S. Kudin, and A.M. Pogrebnoi, "A Mass spectrometric study of vaporization of Lithium-Vanadium Bronze." *Russian Journal of Physical Chemistry*, vol. 70, pp. 1631-1636, 1996.

[194] Y. Kato, M. Asano, T. Harada, and Y. Mizutani, "Mass spectrometric study of vaporization and thermodynamic properties of $Li_2ZrO_3$(s),"*Journal of Nuclear Material*, vol. 203, pp. 27-35, 1993.

[195] M. Asano, Y. Kato, T. Harada, and Y. Mizutani, "Vaporization and thermochemical properties of Li8ZrO6 and comparison with other lithium-cointaining complex oxides," *Journal of Nuclear Material*, vol. 230, pp. 110-115, 1996.

[196] E.K. Kazenas, I.O. Samoilova, G.K. Astakhova, and O.A. Ovchinnikova, "Mass-spectrometric study of the thermodynamics of lithium molybdate evaporation," *Metally*, vol. 1, pp. 34-36, 1999.

[197] M. Yamawaki, K. Yamaguchi, and M. Yasumoto, "Thermochemical study of vaporization of ceramic breeding materials by Knudsen effusion mass spectrometry,"*Journal of Nuclear Material*, vol. 179-181, pp. 804-807, 1991.

[198] S.I. Lopatin, G.A. Semenov, T.S. Pilyugina, and D.O. Kirsanov, "Mass-Spectrometric study of vaporization of Sodium and Cesium Bismuthanes," *The Russian Journal of General Chemistry*, vol. 69, pp. 1234-1238, [Chem. Abstr.], 1999.

[199] K. Jayanthi, V.S. Iyer, S.G. Kulkarni, G.A. Rama Rao, and V. Venugopal, "Molar Gibbs energy of formation of $NaUO_3$(S)," *Journal of Nuclear Material*, vol. 211, pp. 168-174, 1994.

[200] G. Balducci, G. De Maria, G. Gigli, and M. Guido, "The vaporization bahavior of molten potassium metavanadate," *High Temperature Science*, vol. 28, pp. 153-162, 1990.

[201] E.K. Kazenas, I.W. Tsvetkov, I.O. Samoilova, G.K. Astakhova, and A.A. Petrov,"Mass-spektrometricheskoie issl'edovanije termodinamiki ispar'enija molibdata kal'ia," *Metally*, vol. 5, pp. 14-16, 2002.

[202] E.K. Kazenas, I.W. Tsvetkov, I.O. Samoilova, G.K. Astakhova, and A.A. Petrov,"Mass-spektrometricheskoie issl'edovanije termodinamiki ispar'enija volframata kal'ia," *Metally*, vol. 2, pp. 26-28, 2002.

[203] J.K. Gibson,"Mass Spectrometric identification of gaseous Potassium and Cesium pertechnetates and bimetallic Technetium – Rhenium Oxide dimers," *Radiochimica Acta*, vol. 62, pp. 127-132, 1993.

[204] E.K. Kazenas, I.O. Samoilova, G.K. Astakhova, and A.A. Petrov, "Thermodynamics of Rubidium-Molybdate vaporization," *Metally*, vol. 6, pp. 27-30, 2000.

[205] M. Yamawaki, T. Oka, M. Yasumoto, and H. Sakurai, "Thermodynamics of vaporization of cesium molybdate by means of mass spectrometry," *Journal of Nuclear Material*, vol. 201, pp. 257-260, 1993.

[206] G.A. Semenov, L.A. Fokina, and R.A. Mouldagalieva, "Mass spectrometric study of vaporization of cesium tellurate and tellurite," *Journal of Nuclear Material*, vol. 210, pp. 167-171, 1994.

[207] E.K. Kazenas, I.O. Samoilova, and G.K. Astakhova, "Mass-spectrometric study of the thermodynamics of evaporation of lithium tungstate evaporation," *Metally*, vol. 5, pp. 44-46, 2000.

[208] E.K. Kazenas, Iu.V. Tsvetkov, I.O. Samoilova, G.K. Astakhova, and A.A. Petrov, "Mass spectrometric study of the thermodynamics of evaporation of sodium tungstate," *Metally*, vol. 4, pp. 22-24, 2001.

[209] E.K. Kazenas, I.W. Tsvetkov, I.O. Samoilova, G.K. Astakhova, and A.A. Petrov, "Mass-spektrometricheskoie issl'edovanije termodinamiki sublimatsii volframata cez'a," *Metally*, vol. 6, pp. 14-16, 2001.

[210] S.I. Lopatin, G.A. Semenov, and T.S. Pilyugina, "Thermochemical study of gaseous salts of Oxygen-containing acids: V. Cesium Tungstate," *The Russian Journal of General Chemistry,* vol. 70(10), pp. 1494-1496, 2000.

[211] J. Huang, M. Yamawaki, K. Yamaguchi, F. Ono, M. Yasumoto, H. Sakurai, and J. Sugimoto, "Thermodynamics study of the vaporization of $Cs_2UO_4$ by high temperature mass spectrometry," *Journal of Alloys Compounds*, vol. 271-273, pp. 625-628, 1998.

[212] M. Yamawaki, K. Yamaguchi, J. Huang, M. Yasumoto, F. Ono, H. Sakurai, M. Hirai, J. Sugimoto,and Y. Suzuki, "Effects of Hydrogen/Water vapour atmpospheres upon vaporization of UO2-based complex oxides with Sr, Ba, and Cs by means of high temperature Mass Spectrometry," *Journal of the Mass Spectrometry Society of Japan*, vol. 47, pp.16-22, 1999.

[213] J. Huang, M. Yamawaki, K. Yamaguchi, F. Ono, M. Yasumoto, H. Sakurai,and J. Sugimoto, "Vaporization properties of $Cs_2U_4O_{12}$ in LWR severe accident simulating conditions," *Journal of Nuclear Material*, vol. 270, pp. 259-264, 1999.

[214] S.I. Lopatin, and G.A. Semenov, "Thermodynamics of the gaseous Beryllium oxyacid salts," *The Electrochemical Society,* vol. 12, pp. 354-358, 2001.

[215] S.I. Lopatin, and G.A. Semenov, "Thermochemical study of gaseous salts of Oxygen-cointaining acids: VIII. Beryllium molybdate and tungstates," *The Russian Journal of General Chemistry*, vol. 71(8), pp. 1220-1224, 2001.

[216] S.I. Lopatin, and G.A. Semenov, "Thermochemical study of gaseous salts of Oxygen-cointaining acids: VII. Alkaline-Earth metal Niobates," *The Russian Journal of General Chemistry*, vol. 71(6), pp. 828-832, 2001.

[217] S.I. Lopatin, G.A. Semenov, and T.S. Pilyugina, "Determination of heats of formation and atomization for gaseous alkali earth metal tantalates by high temperature Mass Spectrometry method," *The Electrochemical Society*, vol. 99-38, pp.361-364, 1999

[218] V.L. Stolyarova, S.I. Shornikov, and M.M. Shultz, "High-temperature mass spectrometric study of the thermodynamic properties of the CaO-Al2O3 system," *Rapid Communications in Mass Spectrometry*, vol. 9, pp. 686-692, 1995.

[219] M.M. Shulz, and S.I. Shornikov, "Mass-spektrometrichesko'ie issledovan'ie termodinamicheskich svoistv rasplavov aluminatov kal'ia," *Doklady Akademii Nauk*, vol. 340, pp. 350-352, 1995.

[220] J. Huang, M. Yamawaki, K. Yamaguchi, M. Yasumoto, H. Sakurai, and Y. Suzuki, "Investigation of vaporization thermodynamics of $SrUO_3$ by means of mass spectrometry," *Journal of Nuclear Material*, vol. 247, pp.17-20, 1997.

[221] J. Huang, M. Yamawaki, K. Yamaguchi, M. Yasumoto, H. Sakurai, and Y. Suzuki, "Vaporization properties of $SrUO_3$ and $BaUO_3$ in atmospheres simulating accident conditions," *Journal of Nuclear Material*, vol. 248, pp. 257-261, 1997.

[222] K. Nakajima, Y. Arai, Y. Suzuki, and M. Yamawaki, "Vaporization behavior of $SrPuO_3$," *Journal of Nuclear Material*, vol. 248, pp. 233-237, 1997.

[223] W.J.M. Van Der Kemp, H.A.J. Oonk, C. Bergman, and R. Chastel, "Determination of the excess molar Gibbs energy of $\{(1 - x)BaO + xSrO\}$ (s) by means of Knudsen-effusion mass spectrometry," *The Journal of Chemical Thermodynamics*, vol. 24, pp. 857-862, 1992.

[224] K.N. Marushkin, G.D. Nipan, and V.B. Lazarev, "Thermodynamics and ( p,T,x) phase diagram of (barium oxide + diyttrium trioxide)," *The Journal of Chemical Thermodynamics*, vol. 27, pp. 465-474, 1995.

[225] T. Matsui, S. Stolen, and H. Yokoi, "Thermodynamic study of barium zirconates by mass spectrometry," *Journal of Nuclear Material*, vol. 209, pp. 174-179, 1994.

[226] A. Popovic, L. Bencze, J. Marsel, A. Lesar, K. Vass-Balthazar, and O. Kaposi, "Mass Spectrometric investigation of the evaporation properties of $Ba_2CaWO_6$," *Rapid Communications in Mass Spectrometry*, vol. 7, pp. 416-420, 1993.

[227] M. Yamawaki, J. Huang, K. Yamaguchi, M. Yasumoto, H. Sakurai, and Y.Suzuki, "Investigation of the vaporization of $BaUO_3$ by means of mass spectrometry," *Journal of Nuclear Material*, vol. 23, pp. 199-203, 1996.

[228] K. Nakajima, Y. Arai, Y. Suzuki, and M. Yamawaki, "Vaporization behavior of $BaPuO_3$," *Journal of the Mass Spectrometry Society of Japan*, vol. 47, pp. 46-48, 1999.

[229] S.I. Lopatin, and G.A. Semenov, "A Mass Spectrometric study of the vaporization of Boron Phosphare ($BPO_4$)," *Rapid Communications in Mass Spectrometry*, vol. 13, pp. 1398-1400, 1999.

[230] S.I. Lopatin, and G.A. Semenov, "Regularities of vaporization of periodic table group III element Phosphates," *Glass Physics and Chemistry*, vol. 24, pp. 333-336, 1998.

[231] S.I. Lopatin, "Thermal dissociation Boron and Aluminum monophosphates," *The Russian Journal of General Chemistry*, vol. 67(7), pp. 995-998, 1997.

[232] S.I. Lopatin, G.A. Semenov, A.F. Selevich, and S.M. Shugarov, "Vaporization of Gallium monophosphate: a high-temperature Mass Spectral study," *The Russian Journal of General Chemistry*, vol. 69, pp. 534-536, [Chemical Abstract], 1999.

[233] S.I. Lopatin, and G.A. Semenov, and A.F. Selevich, "Mass-Spectrometric study of vaporization of Thallium Phosphates," *The Russian Journal of General Chemistry*, vol. 68(6), pp. 844-846, 1998.

[234] S.I. Lopatin, and G.A. Semenov, and A.F. Selevich, "Vaporization of Indium Phosphates," *The Russian Journal of General Chemistry*, vol. 67(11), pp. 1678-1682, 1997.

[235] S.I. Lopatin, and G.A. Semenov, "Proc'essi Obrazovanija difosfatov Kremn'ia i German'ia," *Zhurnal obshchei khimii,* vol. 65, pp. 1060-1064, 1995.

[236] K. Nakajima, T. Ohmichi, and Y. Arai, "Mass-spectrometric determination of oxygen potential of hypostoichiometric urania–yttria solid solution," *Journal of Nuclear Material*, vol 304, pp. 176-181, 2002.

[237] V.L. Stolyarova, and S. Seetharaman, *Vacuum*, vol. 49, pp. 161-165, 1998.

[238] S.I. Shornikov, A.L. Shilov, and M.M. Schultz, "Vaporization studies of oxide systems using a QMS-420 mass spectrometer," *Zhurnal Fizicheskoi Khimii*, vol. 70, pp. 485-491, 1996.

[239] A.L. Shilov, S.I. Shornikov, I.Yu. Archakov, G.G. Ivanov, V.L. Stolyarova, and M.M. Shultz, "A mass-spectrometric study of thermodynamic parameters of $ZnO-P_2O_5$ system melts," *Glass Physics and Chemistry*, vol. 24, pp. 400-405, [Chemical Abstract], 1998.

[240] S.I. Shornikov,"Vaporization processes and thermodynamic properties of zinc phosphates" *The Electrochemical Society*, vol.12, pp. 316-321, 2001.

[241] J.K. Gibson, "Mass spectrometric identification of gaseous Potassium and Cesium pertechnetates and Bimetallic Technetium – Rhenium Oxide dimers," *Radiochimica Acta*, vol. 62, pp. 127-132, 1993.

[242] A. Matraszek, D. Kobertz, L. Singheiser, K. Hilpert, W. Kuncewicz-Kupczyk, and M. Miller, "Thermodynamics studies of perovskities on the basis of $LaGaO_3$ and implications for SOFC," *The Electrochemical Society*, vol. 2001-16, SOFC VII, Ed. H. Yokokawa, S.C. Singhal, 2001.

[243] W. Kuncewicz-Kupczyk, D. Kobertz, M. Miller, Ch. Chatillon, L. Singheiser, and K. Hilpert, "Vaporization Studies of the $La_2O_3$-$Ga_2O_3$ System," *Journal of the American Ceramic Society*, vol. 85, pp. 2299-2305, 2002.

[244] W. Kuncewicz-Kupczyk, D. Kobertz, M. Miller, L. Singheiser, and K. Hilpert, "Vaporization of Sr- and Mg- doped Lanthanum Gallate and implications for SOFC," *The Journal of the Electrochemical Society*, vol. 148, pp. E276-E281, 2001.

[245] A. Matraszek, D. Kobertz, L. Singheiser, K. Hilpert, W. Kuncewicz-Kupczyk, M. Miller, and M. Martin,"Thermodynamic investigations of Sr- and Mg-doped lanthanum gallate by Knudsen effusion mass spectrometry and defect chemical analysis," *Physical Chemistry Chemical Physics*, vol. 5, pp.3042-3052, 2003.

[246] D-H. Peck, M. Miller, D. Koberts, H. Nickel, and K. Hilpert," Vaporization of $LaCrO_3$: partial and integral thermodynamic properties," *Journal of the American Ceramic Society*, vol. 79, pp. 3266-3272, 1996.

[247] D-H. Peck, M. Miller, and K. Hilpert, "Vaporization and thermodynamics of $La_{1-x}Sr_xCrO_{3-d}$ investigated by Knudsen effusion Mass spectrometry," *Solid State Ionics*, vol. 143, pp. 401-412, 2001.

[248] D-H. Peck, M. Miller, and K. Hilpert, "Vaporization and thermodynamics of $La_{1-x}Ca_xCrO_{3-d}$ investigated by Knudsen effusion Mass spectrometry," *Solid State Ionics*, vol. 143, pp. 391-400, 2001.

[249] D-H. Peck, M. Miller, and K. Hilpert, "Vaporization and thermodynamic activities in $La_{0.80}Sr_{0.2-x}Ca_xCrO_{3-d}$ , x = 0.05, 0.10 and 0.15, investigated by Knudsen effusion Mass Spectrometry," *Journal of the Electrochemical Society*, vol. 148(6), pp. A657-A661, 2001.

[250] M.N. Bulova, A.S. Alikhanyan, and A.M. Gas'kov, "High-temperature thermodynamic study of Micro- and nanocrystalline $SnO_2$–$WO_3$ systems," *Inorganic Materials*, vol. 38(7), pp. 688-693, 2002.

[251] N.A. Asryan, T.N. Kol'tsova, A.S. Alikhanyan, and G.D. Nipan, "Thermodynamics and phase diagram of the $Bi_2O_3$-$SnO_2$ system," *Inorganic Materials*, vol. 38(11), pp. 1351-1358, 2002.

[252] P.G. Wahlbeck, D.L. Myers, and K.V. Salazar, "Bismuth activities in a lead-doped bismuth-2223 superconductor," *Physica C (Amsterdam)*, vol. 252, pp. 147-154, 1995.

[253] G.A. Semenov, and S.I. Lopatin, "A study of evaporation in the $TiO_2$-$Nb_2O_5$ oxide system by high-temperature Mass-spectrometry," *Russian Journal of the Applied Chemistry*, vol. 74(6), pp. 901-906, 2001.

[254] A. Popovic, B. Malic, and L. Bencze, "Knudsen cell mass spectrometric investigation of the PbO-$ZrO_2$-$TiO_2$ system," *Rapid Communications in Mass Spectrometry*, 13, 1129-1137, (1999)

[255] T.S. Lakshmi Narasimhan, M. Sai Baba, and R. Balasubramanian, "Univariant three- and four-phase vaporization equilibria in the ternary Mn−Te−O system: a high-temperature Mass Spectrometric study of Binary xMnO + (1 − x)$TeO_2$ with $x \geq 0.5$," *The Journal Physics Chemistry B*, vol. 106, pp. 6762-6770, 2002.

[256] V.L. Stolyarova, A. Shilov, M.M. Shultz, "Thermodynamic properties of the $UO_2$-$ZrO_2$ system studied by the isothermal mass spectrometric vaporization method," *Journal of Nuclear Material*, vol. 247, pp. 41-45, 1997.

[257] M. Baichi, C. Chatillon, C. Gueneau, and S. Chatain, "Mass spectrometric study of $UO_2$-$ZrO_2$ pseudo-binary system," *Journal of Nuclear Material*, vol. 294, pp. 84-87, 2001.

[258] H. Inaba, and T. Matsui, "Vaporization and diffusion of Mn–Zn ferrite," *Journal of Solid State Chemistry*, vol. 121, pp. 143-148, 1996.

[259] H. Inaba, and T. Matsui, "Vaporization study on Manganese Zinc Ferrites with different Oxygen contents by Mass Spectrometric method," *Journal of the Mass Spectrometry Society of Japan*, vol. 41, pp. 335-342, 1993.

[260] S. Sunder, R. McEachern, and J.C. LeBlanc, "High-temperature, Knudsen cell-mass spectroscopic studies on Lanthanum Oxide/Uranium dioxide solid solutions," *Journal of Nuclear Material*, vol. 294, pp. 59-63, 2001.

[261] N.A. Gribchenkova, A.V. Steblevskii, E.N. Kolosov, A.S. Alikhanian, and G.D. Nipan, "High-temperature Mass Spectrometric vaporization study of the Bi-Sb-O system," *Inorganic Materials*, vol. 1(43), pp. 78-84, 2007.

[262] N.A. Gribchenkova, A.V. Steblevskii, L.L. Meshkov, A.S. Alikhanyan, and G.D. Nipan, "The standard enthalpies of formation of mixed antimony and Bismuth oxides," *Russian Journal of Physical Chemistry A*, vol. 83(5), pp. 713-716, 2009.

[263] V.L. Stoylarova, S.I. Lopatin, and S.M. Shugurov, "Thermodynamic properties of gaseous salts formed by Nickel(II) oxide," *Doklady Phisical Chemistry*, vol. 406(2), pp. 27-29, 2006.

[264] J. Huang, T. Furukawa, and K. Aoto, "Thermodynamic evaluation of sodium ferrite $Na_4Fe_6O_{11}$," *The Journal of Chemical Thermodynamics*, vol. 38, pp. 1-4, 2006.

[265] S.I. Shornikov, "Vaporization behavior and thermodynamic Properties of $K_2O$-$GeO_2$ melts studied by Mass spectrometry," *Inorganic Materials*, vol. 41(12), pp. 1345-1356, 2005.

[266] T.S. Lakshimi Narasimhan, M. Sai Baba, and R. Viswanathan, "Vaporization thermodynamic studies by high-temperature Mass Spectrometry on some three-phase regions over the MnO-$TeO_2$ binary line in the Mn-Te-O ternary systems," *The Journal of Physical Chemistry A*, vol. 110, pp. 13705-13711, 2006.

[267] S. Brutti, T. Terai, M. Yamawaki, M. Yasumoto, G. Balducci, G. Gigli, and A. Ciccioli, "Mass spectrometric investigation of gaseous YbH, YbO and YbOH molecules," *Rapid Communications in Mass Spectrometry*, vol. 19, pp. 2251-2258, 2005.

[268] S. Bruttu, G. Balducci, and G. Gigli, "A gas inlet system coupled wit a Knudsen cell mass spectrometer for high-temperature studies," *Rapid Communications in Mass Spectrometry*, vol. 21, pp. 89-98, 2007.

[269] R. Balasubramanian, N. Lakshmi, R. Viswanathan, and S. Nalini, "Investigation of the vaporization of boric acid by transpiration thermogravimetry and Knudsen effusion mass spectrometry," *The Journal of Physical Chemistry B*, vol. 112, pp. 13873-13884, 2008.

[270] T.S. Lakshimi Narasimhan, M. Sai Baba, and R. Viswanathan, "Vaporization behavior of $TeO_2$(s): a quantitative vaporization-Knudsen effusion mass spectrometric study," *Thermochemica Acta*, vol. 427, pp. 137-147, 2005.

[271] N. Jacobson, D. Myers, E. Opila, and E. Copland, "Interactions of water vapor oxides at elevated temperatures," *Journal of Physics and Chemistry of Solids*., vol. 66, pp. 471-478, 2005.

[272] J.-P. Hiernaut, J.-Y. Colle, Pflieger-Cuvellier, R. Jonnet, J. Somers, and J. Ronchi, "A Knudsen cell-mass spectrometer facility to investigate oxidation and vaporization processes in nuclear fuel," *Journal of Nuclear Materials*, vol. 344(1-3), pp. 246-253, 2005.

[273] M. Miller, and A. Matraszek, "Vaporization and thermochemical study of $SrCeO_3$(s) and $SrCe_{0.95}Yb_{0.05}O_3$(s) by Knudsen effusion mass spectrometry," *Diffusion and Defect Data-Solid State Data, Pt. B: Solid State Phenomena*, vol. 138(Solid Phase Transformations), pp. 319-330, 2008.

[274] J. Y. Colle, J.-P. Hiernaut, D. Papaioannou, C. Ronchi, and A. Sasahara, "Fission product release in high-burn-up $UO_2$ oxidized $U_3O_8$," *Journal of Nuclear Materials*, vol. 348(3), pp. 229-242, 2006.

[275] M. Heyrman, A. Pisch, and C. Chatillon, "Thermodynamics of the Al-C-O ternary system III: mass spectrometric characterization in the alimuna-graphite system," *Journal of the Electrochemical Society*, vol. 154(3), pp. P40-P47, 2007.

[276] E. Copland, "Solidification behavior of γ□-$Ni_3$Al-containing alloys in the Ni-Al-O system," *Acta Materialia*, vol. 55(14), pp. 4853-4865, 2007.

[277] J.-P. Hiernaut, T. Wiss, D. Papaioannou, R. J. M. Konings, V. V. Rondinella, "Volatile fission product behavior during thermal annealing of irradiated $UO_2$ fuel oxidized up to $U_3O_8$," *Journal of Nuclear Materials*, vol. 372(2-3), pp. 215-225, 2008.

[278] J. Koenig, M. Spreitzer, B. Jancar, D. Suvorov, Z. Samardzija, A. Popovic, "The thermal decomposition of $K_{0.5}Bi_{0.5}TiO_3$ ceramics", *Journal of the European Ceramic Society*, vol. 29(9), pp. 1695-1701, 2009.

[279] W. H. Han, M. Miyake, T. Nagai, M. Maeda, "Measurements of vapor pressure of Y and activity of Y in Y-O alloy by multi-Knudsen cell mas spectrometry," *Journal of Alloys and Compounds*, vol. 481(1-2), pp. 241-245, 2009.

[280] L. J. Wang, V. L. Stolyarova, S. I. Lopatin, S. Seetharaman, "High-temperature mass spectrometric study of the vaporization processes in the system CaO-MgO-$Al_2O_3$-$Cr_2O_3$-FeO-$SiO_2$," *Rapid Communications in Mass Spectrometry*, vol. 23(14), pp. 2233-2239, 2009.

[281] J.-P. Hiernaut, P. Gotcu, J.-Y. Colle, R. J. M. Konings, "Thermodynamic study of actinides and lathanides during total vaporization of a very high burn-up $UO_2$ fuel," *Journal of Nuclear Materials*, vol. 378(3), pp. 349-357, 2008.

[282] T. Nagai, M. Miyake, M. Maeda, "Thermodynamic measurement of calcium phosphates by double Knudsen cell mass spectrometry," *Metallurgical and Materials Transactions B*: *Process Metallurgy and Materials Processing Science*, vol. 40B(4), pp. 544-549, 2009.

[283] J.-P. Hiernaut, T. Wiss, J.-Y. Colle, H. Thiele, C. T. Walker, W. Goll, R. J. M. Konings, "Fission product release and microstructure changes during laboratory annealing of a very high burn-up fuel specimen," *Journal of Nuclear Materials*, vol. 377(2), pp. 313-324, 2008.

[284] S. K. Rakshit, Y. P. Naik, S. C. Parida, S. Dash, Z. Singh, B. K. Sen, V. Venugopal, "Synergistic use of Knudsen effusion quadrupole mass spectrometry, solid-state galvanic cell and differential scanning calorymetry for thermodynamic studies on lithium aluminates," *Journal of Solid State Chemistry*, vol. 181(6), pp.1402-1412, 2008.

[285] R. Pflieger, M. Sheindlin, J.-Y. Colle, "Thermodynamic of refractory nuclear materials studied by mass spectrometry of laser-produced vapors," *International Journal of Thermophysics*, vol. 26(4), pp.1075-1093, 2005.

[286] E. Copland, "Comparing the thermodynamic behavior of Al(l) + $ZrO_2$(4%$Y_2O_3$) and Al(l)+$Al_2O_3$," *International Journal of Materials Research*, vol. 97(8), pp. 1108-1114, 2006.

[287] S.I Shornikov, I.Yu. Archakov, M.M. Shul'ts," Mass-spectrometric study of evaporation and thermodynamics properties of Silica: III: equilibrium reactions of molecules occuring in the gas phase over Silica," *Russian Journal General Chemistry*, vol. 70(3), pp. 360-370, 2000.

[288] P. Rocabois, C. Chatillon, C. Bernard , "Vapour pressure and evaporation coefficient of SiO (amorphous) and $SiO_2$(s)+Si(s) mixtures by the multiple Knudsen cell mass spectrometric method," *Reviews in International Hautes Temperatures Refractories*, vol. 28, pp. 37-48, 1993.

[289] D.L. Hildenbrand, K.H. Lau, "Thermochemistry of gaseous SiO(OH), $SiO(OH)_2$, $SiO_2$," *Journal of Chemical Physics*, vol. 101, pp. 6076-6079, 1994.

[290] L.F. Malheiros, C. Chatillon, M. Allibert, "High temperature mass-spectrometric study of the $Na_2O$-$P_2O_5$ and $Na_2O$-$P_2O_5$-$SiO_2$ systems. Activity determination by the multiple Knudsen-cell method," *High Temp.-High Pressures*, vol. 25, pp. 35-51, 1993.

[291] L.F. Malheiros, C. Chatillon, M. Allibert, *Reviews in International Hautes Temperatures Refractories*, vol. 29, pp. 89-99, [Chemical Abstract], 1994.

[292] A.I. Zaitsev, N.E. Shelkova, N.P. Lyakishev, and B.M. Mogutnov, "Thermodynamic study of the $NaPO_3$-$Na_3PO_4$ system. activity measurements in melts of $NaPO_3$-$Na_3PO_4$-SiO2 system at 1673 K by differential Mass spectrometry," *Physical Chemistry Chemical Physics*, vol. 1, pp. 1899-1907, 1999.

[293] A.I. Zaitsev, N.E. Shelkova, and B.M. Mogutnov, Thermodynamics of $Na_2O$-$SiO_2$ melts," *Inorganic Materials*, vol. 36, pp. 529-543, 2000.

[294] F. Bennour, R. Chastel, J.C. Mathieu, J.P Coutures., and C. Bergman, "Determination of the excess thermodynamic functions in ternary Cs2O—SiO2□Na2O melts by Knudsen effusion mass spectrometry," *Physics and Chemistry of Liquids*, vol. 33, pp. 229-248, 1996.

[295] A.I. Zaitsev, N.E. Shelkova, N.P. Lyakishev, and B.M. Mogutnov, "The thermodynamics Properties of Potassium Silicates," *Russian Journal of Physical Chemistry*, vol. 74, pp. 914-917, 2000.

[296] A.I. Zaitsev, N.E. Shelkova, N.P. Lyakishev, and B.M. Mogutnov, "The thermoynamic Properties of $K_2O$-$SiO_2$ melts," *Russian Journal of Physical Chemistry*, vol.74, pp. 907-913, 2000.

[297] P. Bruckmann, N.D. Cheterjee, W. Ramanensee, and K. Bielefeld, "An equation of state for roedderites, $(K, Na)_2Mg_5[Si_{12}O_{30}]$, based on Knudsen cell mass spectrometry and synthesis of eifelite-roedderite crystalline solutions," *Physics and Chemistry of Minerals*, vol. 20, pp. 362-368, 1993.

[298] Y. Kato, M. Asano, T. Harada, and Y. Mizutani, "Mass-spectrometric study of the thermodynamic properties of {xRbBO2 + (1 − x) CsBO2}," *The Journal of Chemical Thermodynamics*, vol. 24, pp. 1033-1038, 1992.

[299] M. Asano, T. Harada, and Y. Mizutani, "Mass spectrometric study of thermodynamic properties in the $RbBO_2$-$SiO_2$ system," *Journal of Mass Spectrometry and Society of Japan*, vol. 44, pp. 21-27, 1996.

[300] Y. Mizutani, T. Abe, M. Asano, M. Inaba, and Z. Ogumi, "Thermodynamic properties in the $CsBO_2$-$SiO_2$ system.," *Journal of Mass Spectrometry and Society of Japan*, vol. 47, pp. 42-45, 1999.

[301] S.I. Shornikov, and I.Yu. Archakov, "High temperature mass spectrometric study of vaporization processes and thermodynamic properties in the MgAl2O4-SiO2 system," *The Electrochemical Society*, vol., 12, pp. 322-329, 2001.

[302] E.R.Plante, J.W. Hastie, and M.Kowalska, "Activity of FeO in the FeO-MgO-$SiO_2$ system determined by Knudsen effusion mass spectrometry," *ISIJ International*, vol. 32, pp. 1276-1279, 1992.

[303] V.L Stolyarova., S.I. Shornikov, and M.M. Shultz, "Mass spectrometric study of vaporization processes and thermodynamic properties of diopside," *Rapid Communications in Mass Spectrometry*, vol. 10, pp. 443-446, 1996.

[304] V.L Stolyarova., S.I. Shornikov, G.G. Ivanov, and M.M. Shultz, "High temperature mass spectrometric study of thermodynamic properties of the CaO-SiO2 system," *Journal of Electrochemical Society*, vol.138, pp. 3710-3714, 1991.

[305] V.L Stolyarova., S.I. Shornikov, and M.M. Shultz, "High-temperature mass spectrometric study of the thermodynamic properties of the CaO-Al2O3-SiO2 system," *High Temperature and Materials Science*, vol. 36, pp. 15-35, 1996.

[306] A.I. Zaitsev, A.D. Litvina, N.P. Lyakishev, and B.M. Mogutnov, "Thermodynamic properties and phase equilibria in the $CaF_2$-$SiO_2$-$Al_2O_3$-CaO system: III. Thermodynamic properties of CaO-$SiO_2$-$Al_2O_3$ melts," *Inorganic Materials*, vol. 34, pp.157-163, 1998.

[307] O. Ostrovski, G. Tranell, V.L. Stolyarova, M.M. S.I. Shultz, Shornikov, and A.I Ishkilydin, "High-temperature Mass-spectrometric study of the CaO-$TiO_2$-$SiO_2$ system," *High Temperature Material Processes*, vol.19, pp.345-356, 2000.

[308] M. Asano, and T. Kou, "Vaporization and thermochemical properties in the BaO-$B_2 0_3$ system," *High Temperature Science*, vol. 29, pp. 171-187, 1990.

[309] M. Asano, and T. Kou, "Thermochemical properties of SrSiO(g) and SrBO2(g)," *The Journal of Chemical Thermodynamics*, vol. 22, pp. 1223-1230, 1990.

[310] E.H.P. Cordfunke, C.P. Groen, M.E. Huntelaar, C.A. Alexander, and J.S. Ogden, "A thermodynamic study of gaseous $BaSiO_3$," *The Journal of Chemical Thermodynamics*, vol. 32, pp. 839-845, 2000.

[311] M. Boike, K. Hilpert, and F. Muller, "Thermodynamic activities in B203-Si02 melts at 1475K," *Journal of the American Ceramic Society*, vol. 76, pp. 2809-2812, 1993.

[312] V.L. Stolyarova, I.Y. Archakov, and M.M. Schul`ts, "High-temperature mass spectrometric study of the thermodynamic properties of borosilicate systems," *High Temperature Science*, vol. 28, pp. 79-86, 1990.

[313] I.Yu. Archakov, V.L. Stolyarova, and M.M. Shultz, "Relative volatility of Borosilicate Glasses: a Mass Spectrometric study," *Rapid Communications in Mass Spectrometry*, vol. 12, pp. 1330-1334, 1998.

[314] V.L. Stolyarova, A.L. Shilov, G.G. Ivanov, M.M. Shultz, and S. Seetharaman, "High temperature mass spectrometric study of the B2O3-Al2O3 system at 1248-1850 K," *Rapid Communications in Mass Spectrometry*, vol. 9, pp. 1244-1251, 1995.

[315] S.I. Schornikov, V.L. Stolyarova, and M.M. Shultz, "High-temperature Mass-Spectrometric study of $3Al_2O_3 \cdot 2SiO_2$," *Rapid Communications in Mass Spectrometry*, vol. 8, pp. 478-480, 1994.

[316] S.I. Shornihov, and I.Yu. Archakov, "A Mass Spectrometric study of the thermodynamic properties of $Al_2O_3$-$SiO_2$ melts," *Russian Journal of Physical Chemistry*, vol. 74, pp. 684-688, 2000.

[317] J. Björkvall, and V.L. Stolyarova, "A mass spectrometric study of $Al_2O_3$-$SiO_2$ melts using a Knudsen cell," *Rapid Communications in Mass Spectrometry*, vol. 15, pp. 836-842, 2001.

[318] S.I. Shornikov, "Study of the Mullite solid solution region in the $Al_2O_3$-$SiO_2$ system by Mass Spectrimetric techniques," *Geochemical International, 40, Suppl.*, vol. 1, pp. S46-S60, 2002.

[319] S.I. Shornikov, I.Yu. Archakov, and M.M. Shul'ts, "A Mass Spectrometric study of the thermodynamic properties of solid phases in the $Al_2O_3$-$SiO_2$ system," *Russian Journal of Physical Chemistry*, vol. 77(7), pp. 1037-1043, 2003.

[320] S.I. Shornikov, I.Yu. Archakov, and M.M. Shul'ts, "A Mass Spectrometric study of the thermodynamic properties of Mullite," *Russian Journal of Physical Chemistry*, vol. 77(7), pp. 1044-1050, 2003.

[321] S. Baud, F. Thevenot, and C. Chatillon, "High temperature sintering of SiC with oxide additives: III. Quantitative vaporization of SiC-$Al_2O_3$ powder beds as revealed by mass spectrometry," *Journal of the European Ceramic Society*, vol. 23, pp. 19-27, 2003.

[322] S. Baud, F. Thevenot, and C. Chatillon, "High temperature sintering of SiC with oxide additives: II. Vaporization processes in powder beds and gas-phase analysis by mass spectrometry," *Journal of the European Ceramic Society*, vol. 23, pp. 9-18, 2003.

[323] A.I. Zaitsev, and B.M. Mogutnov, "Thermodynamic Properties and phase equilibria in the MnO-SiO, system," *Journal of Materials Chemistry*, vol. 5, pp. 1063-1073, 1995.

[324] Z. G. Tyurnina, V. L. Stolyarova, S. I. Lopatin, and E. N. Plotnikov, "Mass spectrometric study of evaporation processes and thermodynamic properties of CaO-$SiO_2$," *Doklady Physical Chemistry*, vol. 409(1), pp186-187, 2006.

[325] T. Nagai, Y. Ogasawara, and M. Maeda, "Thermodynamic measurement of ($Al_2O_3$+$B_2O_3$) system by double Knudsen cell mass spectrometry," *Journal of Chemical Thermodynamics*, vol 41(11), pp. 1292-1296, 2009.

[326] G. Honstein, C. Chatillon, and F. Baillet, "High temperature mass spectrometric study of the vaporization behavior of SiC-$SiO_2$ system," *Journal of Alloys and Compounds*, vol. 452(1), pp. 85-88, 2008.

[327] V.L. Stolyarova, S. Seetharaman, D. Svard, and G.A. Semenov, ., "A high-temperature Mass Spectrometric study of the vaporization processes of fluxes based on CaO-CaCl2 and CaO-CaF2 system," *Rapid Communications in Mass Spectrometry*, vol. 12, pp.1335-1343, 1998.

[328] A.I. Zaitsev, A.D. Litvina, and B.M. Mogutnov, "Thermodynamic properties of the intermediate phases of {x (calcium fluoride) + y (silica) + (1-x-y) calcium oxide}," *The Journal of Chemical Thermodynamics*, vol. 24, pp. 737-750, 1992.

[329] A.I. Zaitsev, A.D. Litvina, and B.M. Mogutno, "Thermodynamic properties of calcium fluoride-silica-calcium oxide {x$CaF_2$ + y$SiO_2$ + (1-x-y)CaO}(I). 1. Experimental," *The Journal of Chemical Thermodynamics*, vol. 24, pp. 1039-1055, 1992.

[330] A.I. Zaitsev, A.D. Litvina, and B.M. Mogutno, "Thermodynamic properties and phase equilibria in the $CaF_2$-$SiO_2$-$Al_2O_3$-CaO system: I. Experimental study of $CaF_2$-$SiO_2$-$Al_2O_3$-CaO melts," *Inorganic Materials*, vol. 33, pp. 1265-1273, 1997.

[331] K. Hilpert, and M. Miller, "Mass Spectrometric identification of novel gaseous Calcium Oxide Bromide and Calcium Oxide Iodide complexes," *Journal of Chemical Phys*ics, vol. 97, pp. 6674-6676, 1992.

[332] V.L. Stolyarova, and S. Seetharaman, "High-temperature mass spectrometric study of the thermodynamic properties of the $DyF_3$-$Dy_2O_3$ system," *Rapid Communications in Mass Spectrometry*, vol. 12, pp. 736-740, 1998.

[333] J. McFarlane, and LeBlanc. "High-temperature Knudsen Cell studies of Cesium Iodide in hyperstoichiometric Uranium Dioxide," *Journal of Nuclear Materials*, vol. 256, pp. 145-154, 1998.

[334] U. Bardi, S. Caporali, and A. Tolstogouzov, "Study on sublimation of solid electrolyte $(AgI)_{0.5}$-$(AgPO_3)_{0.5}$ with Knudsen effusion mass spectrometry," *Rapid Communications in Mass Spectrometry : RCM*, vol. 23(1), pp. 147-50, 2009.

[335] T. Markus, U. Niemann, and K. Hilpert, "High temperature gas phase chemistry for the development of advanced ceramic discharge lamps," *Journal of Physics and Chemistry of Solids*, vol. 66(2-4), pp. 372-375, 2005.

[336] A. Shilov, and L. Holappa, "Mass spectrometric measurements of the gas phase composition over mould powder samples in vacuum conditions at 1550°C," *Steel Research International*, vol. 77(11), pp. 803-808, 2006.

[337] A. Popovic , "Mass Spectrometric investigation of fullerenes. II. determination of the electron impact cross-section of C□60 and C□70," *Rapid Communications in Mass Spectrometry*, vol. 10, pp. 1433-1438, 1996.

[338] S. Matt, D. Muigg, A. Ding, C. Lifshitz, P. Scheier, and T.D. Mark, "Appearance energies of C60 fragment ions revised, " *The Journal of Physical Chem*istry, vol. 100, pp. 8692-8696, 1996.

[339] C.K. Mathews, M. Sai Baba, T.S. Lakshmi Narasimhan, R. Balasubramanian, N. Sivaraman, T.G. Srinivasan, and P.R. Vasudeva Rao, "Vaporization studies of buckminsterfullerene," *The Journal of Physical Chem*istry, vol. 96, pp. 3566-3568, 1992.

[340] A. Popovic, G. Drazic, and J. Marsel, "Mass spectrometric investigations of fullerenes. I. Vapour pressure over the C60/C70 binary system," *Rapid Communications in Mass Spectrometry*, vol. 8, pp. 985-990, 1994.

[341] S. Matt, B. Dünser, M. Lezius, H. Deutsch, K. Becker, A. Stomatovic, P. Scheier, and T.D. Märck, "Absolute partial and total cross section functions for the electron impact ionization of C60 and C70," *The Journal of Chemical Physics*, vol. 105(5), pp. 1880 -1896, 1996.

[342] M. Sai Baba, T.S. Lakshmi Narasimhan, R. Balasubramanian, and C.K. Mathews, "Appearance energy and electron impact ionisation cross-section of C70," *International Journal of Mass Spectrometry and Ion Processes*, vol.114, pp. R1-R6, 1992.

[343] C.K. Mathews, M. Sai Baba, T.S. Lakshmi Narasimhan, R. Balasubramanian, N. Sivaraman, T.G. Srinivasan, and P.R. Vasudeva Rao, "Vapor pressure and enthalpy of sublimation of C70," *Fullerene Science and Technology*, vol.1, pp.101-109, 1993.

[344] M.V. Korobov, E.V. Skokan, P.A. Dorozhko, L.M. Khomich, and A. Kurskaya, "Recent advances in the chemistry and physics of fullerenes and related materials," *The Electrochemical Society,* 1994-24, *Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials,* pp. 1595-1606, 1994.

[345] O.V. Boltalina, E.V. Dashkova, and L.N. Sidorov, Gibbs energies of gas-phase electron transfer reactions involving the larger fullerene anions," *Chemical Physics Letters*, vol. 256, pp.253-260, 1996.

[346] O.V. Boltalina, V.Yu. Markov, A.Ya. Borschevskii, L.N. Sidorov, V.N. Bezmelnitsin, A.V. Eletskii, and R. Taylor, "An evaporation study of C76 by Knudsen cell mass spectrometry." *Rapid Communications in Mass Spectrometry*, vol. 12, pp. 1028-1030, 1998.

[347] O.V. Boltalina, V.Yu. Markov, A.Ya. Borschevskii, V.Ya. Davydov, L.N. Sidorov, V.N. Bezmelnitsin, A.V. Eletskii, and R. Taylor, "Saturated vapor pressure and enthalpy of sublimation of C84," *Mendeleev Communication*, vol. 4, pp. 141-143, 1998.

[348] O.V. Boltalina, I.N. Ioffe, L.N. Sidorov, G. Seifert, and K.Vietze, "Ionization energy of Fullerenes"," *The Journal of the American Chemical Society*, vol.122, pp. 9745-9749, 2000.

[349] L.N. Sidorov, O.V. Boltalina, and A.Ya. Borshchevsky, "Ion/Molecule equilibria in Fullerene vapours, electron affinities of higher Fullerenes and some fluoroderivatives," *Rapid Communications in Mass Spectrometry*, vol. 11, pp. 662-663, 1997.

[350] P.A. Dorozhko., A.S. Lobach, A.A. Popov, V.M. Senyavin, and M.V. Korobov, "Sublimation of hydrofullerenes $C_{60}H_{36}$ and $C_{60}H_{18}$," *Chemical Physics Letters*, vol. 336, pp. 39-46, 2001.

[351] O.V. Boltalina, L.N. Sidorov, E.V. Sukhanova, and I.D. Sorokin, "Observation of difluorinated higher fullerene anions by Knudsen cell mass spectrometry and determination of electron affinities of $C_{60}F_2$ and $C_{70}F_2$," *Chemical Physics Letters*, vol. 230, pp. 567-570, 1994.

[352] O.V. Boltalina, V.Yu. Markov, A.Ya. Borschevskii, N.A. Galeva, L.N. Sidorov, G. Gigli, and G. Balducci, "Saturated vapor pressure and sublimation enthalpy of Fluorine derivatives of C60," *The Journal of Physical Chemistry B*, vol. 103, pp. 3828-3832, 1999.

[353] O.V. Boltalina, Y.Yu. Markov, A.Ya. Borschevsky, L.N. Sidorov, and Popovich A., "Enthalpy of sublimation of $C_{60}F_{36}$," *Mendeleev Communication,* vol. 6, pp. 253-254, 1996.

[354] O.V. Boltalina, I.N. Ioffe, I.D. Sorokin, and L.N. Sidorov, "Electron affinity of some endohedral Lanthanide Fullerenes" *The Journal of Physical Chemistry A*, vol. 101, pp. 9561-9563, 1997.

[355] N.S. Chilingarov, A.V. Nikitin, J.V. Rau, and L.N. Sidorov, *Fullerene Science and Technology*, vol. 6, pp. 577-598, 1998.

[356] A.Ya. Borshchevsky, V.E. Alyoshina, L.N. Sidorov, O.V. Boltalina, A.V. Astakhov, and N.B. Shustova, "Mass spectrometric study of $C_{60}$ and $C_{60}$-$NiF_2$ fluorination with molecular fluorine," *The Electrochemical Society,* vol., 11, pp. 426-461, 2001.

[357] P.A. Dorozhko, A.A. Popov, M.V. Korobov, and B.L. Tumanskii, "Solid-state fluorination of [60] fullerene: comprehensive mass spectroscopic investigation and kinetic model for the reactions," *Chemical Physics Letters*, vol. 287, pp. 154-161, 1998.

[358] D.Yu. Borisova, A.A. Mavrin, L.N. Sidorov, E.V. Skokan, J.G. Edwards, F.M. Spiridonov, A.Yu. Borshchevsky, and I.N. Ioffee, *Fullerene Science and Technology*, vol.6, pp. 519-544, 1998.

[359] A. A. Goryunkov, I. E. Kareev, I. N. Ioffe, A. A. Popov, I. V. Kuvychko, V. Y. Markov, I.V. Goldt, A. S. Pimenova, M. G. Serov, and S. M. Avdoshenko, "Stability of gaseous fullerene chlorides," *Journal of Fluorine Chemistry*, vol. 127(10), pp. 1423-1435, 2006.

[360] A. Ya. Borshchevskii, V. E. Aleshina, V. Yu. Markov, E. I. Dorozhkin, and L. N. Sidorov, "High temperature vaporization and thermodynamic properties of the potassium - C60 phases," *Inorganic Materials*, vol. 41(12), pp. 1318-1326, 2005.

[361] A. Matraszek, D. Kobertz, L. Singheiser , K. Hilpert, W. Kuncewicz-Kupczyk, M. Miller, O. Schulz, and M. Martin, Martin, M., "Thermodynamic and cation diffusion studies of Perovskites on the basis of $LaGaO_3$ and implications for SOFC," *Materialwissenschaft und Werkstofftechnik*, vol. 33, pp. 355-362, 2002.

[362] A. Matraszek, M. Miller, L. Singheiser, K. Hilpert, "Phase composition and vaporization study of LaGa1-xAlxO3, 0 □x □1, and La0.9Sr0.1Ga0.8-xAlxMg0.2O2.85, x =0.1, 0.2, 0.3," *Journal of the American Ceramic Society*, vol. 86, pp. 1911–1917, 2003.


Received: January 25, 2011 Revised: November 21, 2012 Accepted: December 04, 2012