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|  | **Fe-Ni-S experiments** | **Fe-Ni-P experiments** |
| **Run #** | **JG47** | **JG42** | **JG48** | **JG49** | **JG46** | **JG43** |
| **Temperature (˚C)** | 1475 | 1460 | 1440 | 1420 | 1450 | 1400 |
| **Duration (hours)** | 23 | 26 | 24 | 24 | 26 | 67 |
| **Liquid Metal** |  |  |  |  |  |  |
| Fe (wt%) | 85.8 ± 0.5 | 85.7 ± 0.6 | 86.3 ± 0.6 | 84.8 ± 0.9 | 87.3 ± 0.5 | 82.5 ± 0.8 |
| Ni (wt%) | 12.40 ± 0.15 | 11.74 ± 0.15 | 11.12 ± 0.14 | 10.27 ± 0.17 | 10.53 ± 0.12 | 13.94 ± 0.18 |
| P (wt%) | - | - | - | - | 2.0 ± 0.3 | 3.2 ± 0.6 |
| S (wt%) | 2.0 ± 0.6 | 3.1 ± 0.7 | 3.9 ± 0.8 | 6.8 ± 1.2 | - | - |
| Co (ppm) | 370 ± 10 | 317 ± 11 | 370 ± 20 | 282 ± 14 | 434 ± 16 | 422 ± 5 |
| Cu (ppm) | 150 ± 19 | 240 ± 30 | - | 690 ± 40 | 181 ± 5 | 106 ± 3 |
| Ga (ppm) | 27 ± 3 | 31 ± 4 | 32.1 ± 1.4 | 33.8 ± 1.2 | 16.9 ± 1.6 |  3.2 ± 0.3 |
| Ge (ppm) | 26 ± 4 | 20 ± 4 | 35.6 ± 1.9 | 75 ± 9 | 84 ± 9 | 26 ± 2 |
| As (ppm) | 330 ± 80 | 290 ± 30 | 185 ± 17 | 240 ± 60 | 269 ± 8 | 165 ± 10 |
| Mo (ppm) | 380 ± 80 | 271 ± 14 | 400 ± 30 | 430 ± 70 | 360 ± 30 | 468 ± 12 |
| Ru (ppm) | 180 ± 30 | 145 ± 15 | 190 ± 30 | 140 ± 20 | 216 ± 18 | 370 ± 30 |
| Rh (ppm) | 250 ± 50 | 210 ± 20 | 240 ± 40 | 190 ± 20 | 269 ± 12 | 380 ± 30 |
| Pd (ppm) | 140 ± 30 | 123 ± 9 | 118 ± 11 | 127 ± 14 | 151 ± 3 | 73 ± 4 |
| Ag (ppm) | 0.47 ± 0.12 | 2.8 ± 0.9 | 1.6 ± 0.4 | 2.2 ± 0.6 | 0.18 ± 0.13 | -  |
| Sn (ppm) | - | 1800 ± 300 | - | 1100 ± 170 | 1090 ± 110 | - |
| Sb (ppm) | - | 950 ± 60 | 1000 ± 70 | 1380 ± 150 | 570 ± 50 | - |
| W (ppm) | 61 ± 15 | 38 ± 3 | 47 ± 9 | 30 ± 4 | 73 ± 2 | 43 ± 5 |
| Re (ppm) | 44 ± 6 | 33 ± 5 | 44 ± 9 | 19 ± 3 | 53 ± 5 | 32 ± 4 |
| Os (ppm) | 40 ± 11 | 30 ± 5 | 29 ± 8 | 19 ± 3 | 61 ± 8 | 40 ± 2 |
| Ir (ppm) | 55 ± 10 | 42 ± 6 | 55 ± 13 | 28 ± 3 | 65 ± 7 | 47 ± 8 |
| Pt (ppm) | 150 ± 30 | 140 ± 10 | 138 ± 16 | 81 ± 8 | 142 ± 13 | 220 ± 20 |
| Au (ppm) | 1100 ± 200 | 1140 ± 160 | 590 ± 60 | 470 ± 70 | 390 ± 30 | 620 ± 80 |
| **Solid Metal** |  |  |  |  |  |  |
| Fe (wt%) | 89.1 ± 0.9 | 89.6 ± 1.1 | 89.9 ± 0.5 | 90.5 ± 0.5 | 90.4 ± 1.0 | 87.6 ± 1.3 |
| Ni (wt%) | 10.7 ± 0.6 | 10.0 ± 0.3 | 9.97 ± 0.19 | 9.37 ± 0.15 | 9.20 ± 0.17 | 11.9 ± 1.1 |
| P (wt%) | - | - | - | - | 0.19 ± 0.02 | 0.31 ± 0.02 |
| Co (ppm) | 359 ± 5 | 330 ± 10 | 415 ± 12 | 346 ± 11 | 450 ± 7 | 404 ± 4 |
| Cu (ppm) | 160 ± 40 | 180 ± 60 | 210 ± 40 | 235 ± 8 | 190 ± 40 | 120 ± 70 |
| Ga (ppm) | 38 ± 8 | 41 ± 11 | 42 ± 9 | 47 ± 2 | 32 ± 18 | 4.5 ± 1.5 |
| Ge (ppm) | 50 ± 30 | 50 ± 30 | 50 ± 30 | 91 ± 8 | 80 ± 20 | 32 ± 9 |
| As (ppm) | 70 ± 20 | 58 ± 3 | - | 41 ± 2 | 69 ± 7 | 43 ± 5 |
| Mo (ppm) | 210 ± 40 | 175 ± 8 | 280 ± 30 | 268 ± 10 | 184 ± 13 | 240 ± 20 |
| Ru (ppm) | 250 ± 30 | 223 ± 5 | 390 ± 40 | 338 ± 17 | 290 ± 20 | 480 ± 60 |
| Rh (ppm) | 270 ± 20 | 241 ± 5 | 340 ± 30 | 295 ± 15 | 260 ± 20 | 380 ± 30 |
| Pd (ppm) | 64 ± 4 | 55 ± 3 | 52 ± 7 | 50 ± 4 | 72 ± 9 |  43 ± 4 |
| Ag (ppm) | - | 0.18 ± 0.06 | - | 0.30 ± 0.16 | - | 0.10 ± 0.04 |
| Sn (ppm) | 115 ± 15 | 153 ± 9 | - | 74 ± 5 | 130 ± 40 | 98 ± 14 |
| Sb (ppm) | 89 ± 14 | 90 ± 30 | 80 ± 20 | 78 ± 5 | 90 ± 30 | 65 ± 12 |
| W (ppm) | 64 ± 15 | 48 ± 3 | 70 ± 10 | 64 ± 4 | 75 ± 3 | 43.2 ± 1.5 |
| Re (ppm) | 80 ± 14 | 74 ± 6 | 150 ± 11 | 119 ± 9 | 108 ± 4 | 69 ± 17 |
| Os (ppm) | 105 ± 9 | 85 ± 3 | 131 ± 19 | 124 ± 6 | 143 ± 9 | 100 ± 30 |
| Ir (ppm) | 112 ± 14 | 93.7 ± 1.2 | 190 ± 30 | 139 ± 8 | 138 ± 6 | 100 ± 30 |
| Pt (ppm) | 180 ± 20 | 164 ± 6 | 220 ± 30 | 196 ± 15 | 193.6 ± 1.7 | 310± 50 |
| Au (ppm) | 320 ± 60 | 320 ± 20 | 180 ± 30 | 169 ± 13 | 176 ± 16 | 260 ± 30 |
| **D (solid met/liq. met)** |  |  |  |  |  |  |
| Ni | 0.87 ± 0.05 | 0.86 ± 0.03 | 0.90 ± 0.02 | 0.91 ± 0.02 | 0.873 ± 0.019 | 0.85 ± 0.08 |
| P | - | - | - | - | 0.10 ± 0.02 | 0.10 ± 0.02 |
| Co | 0.97 ± 0.03 | 1.05 ± 0.05 | 1.13 ± 0.07 | 1.23 ± 0.07 | 1.04 ± 0.04 | 0.96 ± 0.01 |
| Cu | 1.1 ± 0.3 | 0.8 ± 0.3 | - | 0.34 ± 0.02 | 1.0 ± 0.3 | 1.1 ± 0.6 |
| Ga | 1.4 ± 0.3 | 1.3 ± 0.4 | 1.3 ± 0.3 | 1.37 ± 0.09 | 1.9 ± 1.1 | 1.4 ± 0.5 |
| Ge | 2.0 ± 1.1 | 2.6 ± 1.7 | 1.5 ± 0.7 | 1.22 ± 0.18 | 1.0 ± 0.3 | 1.2 ± 0.4 |
| As | 0.22 ± 0.08 | 0.20 ± 0.03 | - | 0.17 ± 0.04 | 0.26 ± 0.03 | 0.26 ± 0.04 |
| Mo | 0.57 ± 0.15 | 0.65 ± 0.05 | 0.70 ± 0.09 | 0.62 ± 0.11 | 0.50 ± 0.05 | 0.52 ± 0.05 |
| Ru | 1.4 ± 0.3 | 1.54 ± 0.16 | 2.1 ± 0.4 | 2.3 ± 0.4 | 1.32 ± 0.15 | 1.28 ± 0.19 |
| Rh | 1.1 ± 0.2 | 1.15 ± 0.11 | 1.4 ± 0.2 | 1.5 ± 0.2 | 0.96 ± 0.09 | 1.00 ± 0.12 |
| Pd | 0.47 ± 0.12 | 0.45 ± 0.04 | 0.44 ± 0.07 | 0.39 ± 0.05 | 0.48 ± 0.06 | 0.59 ± 0.06 |
| Ag | - | 0.07 ± 0.03 | - | 0.14 ± 0.08 | - | -  |
| Sn | - | 0.09 ± 0.01 | - | 0.07 ± 0.01 | 0.12 ± 0.04 | - |
| Sb | - | 0.10 ± 0.03 | 0.08 ± 0.02 | 0.06 ± 0.01 | 0.16 ± 0.05 | - |
| W | 1.1 ± 0.4 | 1.25 ± 0.14 | 1.6 ± 0.4 | 2.2 ± 0.3 | 1.04 ± 0.05 | 1.01 ± 0.11 |
| Re | 1.8 ± 0.4 | 2.3 ± 0.4 | 3.4 ± 0.7 | 6.2 ± 1.1 | 2.1 ± 0.2 | 2.2 ± 0.6 |
| Os | 2.7 ± 0.8 | 2.8 ± 0.5 | 4.5 ± 1.4 | 6.6 ± 1.0 | 2.4 ± 0.3 | 2.5 ± 0.8 |
| Ir | 2.0 ± 0.5 | 2.2 ± 0.3 | 3.4 ± 0.9 | 4.9 ± 0.7 | 2.1 ± 0.3 | 2.1 ± 0.7 |
| Pt | 1.1 ± 0.3 | 1.15 ± 0.09 | 1.6 ± 0.3 | 2.4 ± 0.3 | 1.36 ± 0.12 | 1.4 ± 0.3 |
| Au | 0.31 ± 0.08 | 0.28 ± 0.04 | 0.3 ± 0.07 | 0.36 ± 0.06 | 0.45 ± 0.05 | 0.42 ± 0.08 |

**Table S1.** Results for experiments in the Fe-Ni-S and Fe-Ni-P systems. All errors are ± 2