**Table S3.** Experimental partitioning results containing (Fe,Ni)2P. All errors are ±2σ.

Run # R1P5 R1P8

Temperature (°C) 1100 1100

Duration (hours) 96 48

P-rich melt

 Fe (wt%) 65.5 ± 1.3 53.3 ± 1.7

 P (wt%) 16.1 ± 2.1 16.4 ± 2.1

 Ni (wt%) 19.7 ± 0.4 28.7 ± 1.1

 V(ppm) 12 ± 1 20 ± 4

 Co (ppm) 530 ± 20 712 ± 63

 Cu (ppm) 318 ± 7 279 ± 52

 Ga (ppm) 31 ± 6 7.6 ± 1.2

 Ge (ppm) 121 ± 15 136 ± 4

 As (ppm) 181 ± 21 191 ± 14

 Mo (ppm) 253 ± 11 285 ± 45

 Ru (ppm) 190 ± 18 230 ± 7

 Rh (ppm) 118 ± 4 134 ± 10

 Pd (ppm) 102 ± 10 139 ± 48

 Ag (ppm) 19 ± 4 97 ± 69

 Sn (ppm) 295 ± 39 345 ± 163

 Sb (ppm) 219 ± 44 363 ± 162

 W (ppm) 90 ± 5 107 ± 5

 Re (ppm) 124 ± 12 114 ± 14

 Os (ppm) 103 ± 6 84 ± 4

 Ir (ppm) 130 ± 14 104 ± 4

 Pt (ppm) 96 ± 14 75 ± 7

 Au (ppm) 173 ± 31 157 ± 42

(Fe,Ni)2P

 Fe (wt%) 64.3 ± 1.8 56.2 ± 1.3

 P (wt%) 22.5 ± 2.9 22.0 ± 2.9

 Ni (wt%) 14.0 ± 0.6 20.8 ± 0.9

 V(ppm) 46 ± 2 46 ± 13

 Co (ppm) 513 ± 33 713 ± 51

 Cu (ppm) 50 ± 5 23 ± 6

 Ga (ppm) 7.9 ± 0.5 3.9 ± 1.2

 Ge (ppm) 37 ± 2 32 ± 8

 As (ppm) 81 ± 12 52 ± 14

 Mo (ppm) 539 ± 66 626 ± 55

 Ru (ppm) 143 ± 16 189 ± 15

 Rh (ppm) 54 ± 5 65 ± 3

 Pd (ppm) 9.2 ± 1.5 11 ± 0.6

 Ag (ppm) 0.3 ± 0.2 0.5 ± 0.2

 Sn (ppm) 1.8 ±1.1 0.8 ± 0.3

 Sb (ppm) 1.9 ± 0.5 1.3 ± 0.4

 W (ppm) 89 ± 2 108 ± 5

Table S3. *Continued*. Experimental partitioning results containing (Fe,Ni)2P. All errors are ±2σ.

Run # R1P5 R1P8

 Re (ppm) 26 ± 1 36 ± 2

 Os (ppm) 17 ± 2 21 ± 1

 Ir (ppm) 11 ± 1 14 ± 1

 Pt (ppm) 0.9 ± 0.5 1.0 ± 0.3

 Au (ppm) 1.2 ± 0.2 1.3 ± 0.5

D ((Fe,Ni)2P)/(P-rich melt)

 P 1.4 ± 0.3 1.3 ± 0.3

 Ni 0.71 ± 0.03 0.73 ± 0.04

 V 3.90 ± 0.45 2.32 ± 0.80

 Co 0.97 ± 0.07 1.00 ± 0.11

 Cu 0.16 ± 0.01 0.08 ± 0.03

 Ga 0.25 ± 0.05 0.51 ± 0.18

 Ge 0.31 ± 0.04 0.24 ± 0.06

 As 0.45 ± 0.09 0.27 ± 0.08

 Mo 2.13 ± 0.28 2.20 ± 0.40

 Ru 0.75 ± 0.11 0.82 ± 0.07

 Rh 0.46 ± 0.04 0.49 ± 0.04

 Pd 0.09 ± 0.02 0.08 ± 0.03

 Ag 0.02 ± 0.01 0.005 ± 0.004

 Sn 0.006 ± 0.004 0.002 ± 0.001

 Sb 0.009 ± 0.003 0.004 ± 0.002

 W 0.99 ± 0.06 1.01 ± 0.07

 Re 0.21 ± 0.02 0.32 ± 0.04

 Os 0.17 ± 0.02 0.25 ± 0.02

 Ir 0.08 ± 0.01 0.13 ± 0.01

 Pt 0.009 ± 0.005 0.014 ± 0.005

 Au 0.007 ± 0.002 0.008 ± 0.004