Supplementary Information

Table A. Theoretical phosphorus chemical shift tensors for $M[N(^{i}Pr_2PSe)_2]_2$ (M = Zn, Cd, Hg)

M^{II}	δ_{iso} ppm	δ_{11} ppm	δ_{22} ppm	δ_{33} ppm
Zn	98.7	137.8	103.1	55.3
	97.3	136.3	99.2	56.3
	95.3	132.6	97.3	56.0
	95.2	131.5	98.1	55.9
Cd	100.5	140.2	100.1	61.4
	96.8	137.7	94.3	58.6
	93.2	135.4	86.0	58.2
	88.6	128.3	89.0	48.4
Hg	96.5	138.3	90.9	60.2
	93.0	132.2	94.2	52.4
	92.4	131.0	91.0	55.1
	91.8	131.1	88.6	55.7

Table B. Theoretical selenium chemical shift tensors for $M[N(^{i}Pr_2PSe)_2]_2$ (M = Zn, Cd, Hg)

M^{II}	δ_{iso} ppm	δ_{11} ppm	δ_{22} ppm	δ_{33} ppm
Zn	-291	138	-444	-566
	-292	136	-434	-578
	-292	153	-445	-584
	-293	135	-443	-572
Cd	-320	161	-424	-696
	-337	153	-452	-712
	-341	133	-455	-702
	-348	117	-460	-703
Hg	-235	183	-375	-515
	-243	183	-372	-540
	-246	188	-393	-535
	-249	175	-393	-530

Table C. Theoretical cadmium and mercury magnetic shielding tensors for $M[N(^{i}Pr_2PSe)_2]_2$ (M = Cd, Hg)

M^{II}	σ_{iso} ppm	σ_{11} ppm	σ_{22} ppm	σ_{33} ppm
Cd	2809	2798	2801	2828
Hg	5463	5417	5438	5534

Table D. Traceless phosphorus chemical shift tensors for $M[N(^{i}Pr_2PSe)_2]_2$ (M = Zn, Cd, Hg)

M^{II}		δ_{iso} ppm	δ_{11} ppm	δ_{22} ppm	δ_{33} ppm
Zn					
	Expt	0	20.3	5.7	-25.9
		0	20.4	6.6	-27.0
		0	24.0	5.7	-29.7
		0	22.1	5.9	-27.9
	Calc	0	39.1	4.4	-43.4
		0	39.0	1.9	-41.0
		0	37.3	2.0	-39.3
		0	36.3	2.9	-39.3
Cd					
	Expt	0	20.3	4.4	24.7
		0	20.8	4.7	-25.4
		0	22.2	3.9	-26.2
		0	21.9	5.0	-26.9
	Calc	0	39.7	-0.4	-39.1
		0	40.9	-2.5	-38.2
		0	42.2	-7.2	-35.0
		0	39.7	0.4	-40.2
Hg					
	Expt	0	21.2	4.1	-25.2
		0	21.2	4.1	-25.3
		0	23.5	3.3	-26.9
		0	22.6	4.9	-27.6
	Calc	0	41.8	-5.6	-36.3
		0	39.2	1.2	-40.6
		0	38.6	-1.4	-37.3
		0	39.3	-3.2	-36.1

Table E. Traceless selenium chemical shift tensors for $M[N(^{i}Pr_2PSe)_2]_2$ (M = Zn, Cd, Hg)

M^{II}		δ_{iso} ppm	δ_{11} ppm	δ_{22} ppm	δ_{33} ppm
Zn					
	Expt	0	420	-174	-247
		0	420	-151	-269
		0	403	-155	-247
		0	439	-159	-279
	Calc	0	429	-153	-275
		0	428	-142	-286
		0	445	-153	-292
		0	428	-150	-279
Cd					
	Expt	0	438	-114	-324
		0	436	-98	-338
		0	444	-101	-344
		0	444	-101	-344
	Calc	0	481	-104	-376
		0	490	-115	-375
		0	474	-114	-361
		0	465	-112	-355
Hg					
	Expt	0	405	-122	-283
		0	407	-118	-290
		0	404	-121	-284
		0	426	-130	-295
	Calc	0	418	-140	-280
		0	426	-129	-297
		0	434	-147	-289
		0	424	-144	-281

Table F. Traceless cadmium and mercury chemical shift tensors for $M[N(^{i}Pr_2PSe)_2]_2$ (M = Cd, Hg)

M^{II}	δ_{iso} ppm	δ_{11} ppm	δ_{22} ppm	δ_{33} ppm
Cd				
Expt	0	54	34	-89
Calc	0	11	8	-19
Hg				
Expt	0	296	226	-522
Calc	0	46	25	-71