**Supplementary Information:**

**A Progress Report on the MAB Phases:**

**Atomically Laminated, Ternary Transition Metal Borides**

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**Table S1**. Unit cell parameters, LPs, and volumes, V, reported in the literature. The standard uncertainties of the last digits for experimentally derived LPs are specified in parentheses.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Phase** | **a (Å)** | **b (****Å)** | **c (Å)** | **V (Å3)** | **Synthesis** | **Refs.** |
| **Cr2AlB2** | 2.937 | 11.07 | 2.971 | 96.59 | Arc-melted | (1) |
| 2.9373(3) | 11.0513(12) | 2.9675(3) | 96.3280 | Al flux | (2) |
| 2.9387(3) | 11.0605(1) | 2.9714(3) | 96.58 | Arc-melted | (3) |
| 2.9367(1) | 11.0471(3) | 2.9668(1) | 96.2490 | Furnace Synthesis | (4) |
| 2.9370(1) | 11.0465(4) | 2.9683(3) | 96.3023 | Furnace Synthesis | (5) |
| 2.949(6) | 11.10(1) | 2.948(5) | 96.53 | Arc-melted | (6) |
| 2.9392(5) | 11.0551(1) | 2.9701(6) | 96.512 | Furnace Synthesis | (7) |
| 2.9232 | 11.0511 | 2.9334 | 94.76 | DFT | (3) |
| 2.9407 | 11.0308 | 2.9642 | 96.1535 | DFT | (8) |
| 2.9256 | 11.0423 | 2.9366 | 94.87 | DFT | (9) |
| 2.921 | 11.034 | 2.929 | 94.403 | DFT | (10) |
| **Cr3AlB4** | 2.952 | 2.989 | 8.091 | 71.3912 | Arc-melted | (1) |
| 2.9489(1) | 2.985(4) | 8.077(4) | 71.110 | Furnace Synthesis | (4) |
| 2.9556(4) | 2.9778(5) | 8.0539(14) | 70.8839 | Al flux | (2) |
| 2.9533 | 2.9718 | 8.1043 | 71.1283 | DFT | (8) |
| 2.9380 | 2.9778 | 8.0538 | 69.95 | DFT | (9) |
| **Cr4AlB6** | 2.9517(4) | 21.280(3) | 3.0130(3) | 189.253 | Al flux | (2) |
| 2.9715 | 21.3894 | 2.9610 | 188.1970 | DFT | (8) |
| 2.9467 | 21.3217 | 3.0130 | 189.25 | DFT | (9) |
| **Mn2AlB2** | 2.92 | 11.08 | 2.89 | 93.50 | HPed | (11) |
| 2.9180(4) | 11.038(2) | 2.8932(5) | 93.1867 | Al flux | (2) |
| 2.936(5) | 11.12(1) | 2.912(8) | 95.06 | Arc-melted | (6) |
| 2.9231(2) | 11.0698(9) | 2.8993(2) | 92.82 | Arc-melted | (3) |
| 2.9166(6) | 11.048(3) | 2.8930(6) | 93.22 | Furnace Synthesis | (12) |
| 2.9300(6) | 11.0186(12) | 2.8975(8) | 93.54(3) | Arc-melted | (13) |
| 2.919(1) | 11.060(3) | 2.901(1) | 93.656 | Hot-pressed | (14) |
| 2.8949 | 11.0750 | 2.8306 | 90.7519 | DFT | (3) |
| 2.8872.8902.892 | 11.10911.05011.056 | 2.8302.8172.826 | 90.76389.9594990.358 | DFT (AFM)DFT (NM) DFT (FM) | (10)\* |
| **Fe2AlB2** | 2.9233(10) | 11.0337(14) | 2.8703(3) | 92.58(5) | Induction melting | (15) |
| 2.923(2) | 11.046(5) | 2.875(2) |  |  | (16) |
| 2.9241(17) | 11.0339(3) | 2.8701(5) |  | Arc-melted | (17) |
| 2.9283(3)2.9311(2) | 11.0334(4)11.0376(3) | 2.8682(3)2.8783(2) | 92.66993.119 | Arc-meltedGa flux | (18) |
| 2.9054 | 10.9542 | 2.8271 |  | DFT | (19) |
| 2.9263(3) | 11.0295(9) | 2.8666(3) | 92.52(2) | Arc-melted | (13) |
| 2.945(4) | 11.09(1) | 2.887(3) | 94.39 | Arc-melted | (6) |
| 2.9308(2) | 11.0477(8) | 2.8755(2) | 93.103 | Melt spun | (20) |
| 2.9217(4) | 10.991(15) | 2.8563(5) | 91.79 | Al flux | (2) |
| 2.9256(4)2.9172.917 | 11.0247(4)11.01111.010 | 2.8709(2)2.8642.864 | 92.6092.00191.972 | Arc-meltedDFT (PM)DFT (FM) | (21) |
| 2.931(1) | 11.028(4) | 2.861(1) | 92.5 | Arc-melted | (22) |
| 2.9258(4) | 11.0278(9) | 2.8658(3) |  | Arc-melted | (23) |
| 2.9290(7)2.9315(4)2.9251(3) | 11.0393(24)11.0449(19)11.0296(15) | 2.8671(7)2.8733(6)2.8685(3) | 92.707(24)93.034(20)92.546(25) | SPSAl fluxArc-melted | (24) |
| 2.915 | 11.017 | 2.851 |  | DFT (FM) | (10) |
| 2.9286(3) | 11.032(1) | 2.8696(3) |  | Furnace Synthesis | (5) |
| 2.92398(04)2.92195(04) | 11.02152(10)11.01580(10) | 2.86464(04)2.86335(04) |  | Arc-meltedArc-melted | (25) |
| 2.9258(4) | 11.0278(9) | 2.8658(3) | 92.46 | Arc-melted | (3) |
| 2.9162 | 11.0225 | 2.8515 | 91.66 | DFT | (3) |
| 2.929(0) | 11.034(9) | 2.866(2) |  | Arc-melted | (26) |
| 2.924(1) | 11.029(9) | 2.866(0) |  | Suction Cast | (27) |
| 2.9168(6) | 11.033(2) | 2.866(6) | 92.23 | Al flux | (28)  |
| 2.929 | 11.035 | 2.870 | 92.763 | Arc-melted | (29) |
| **MoAlB** | 3.212(2) | 13.985(4) | 3.102(1) | 139.341 | Single Crystal | (30) |
| 3.206 | 14.01 | 3.050 | 136.994 | Single Crystal | (31) |
| 3.213(1) | 13.986(1) | 3.103(1) | 139.440 |  Single Crystal | (32) |
| 3.1987(4) | 13.9218(14) | 3.0937(3) | 137.768 | Single Crystal | (2) |
| 3.21288(10) | 13.97818(43) | 3.10322(10) | 139.36628 | HPed | (33) |
| 3.17183.2227 | 13.82514.037 | 3.06503.1067 |  | DFT (LDA)DFT (GGA) | (34) |
| 3.1960 | 13.9116 | 3.0912 |  | DFT (GGA) | (35) |
| 3.215 | 14.049 | 3.106 | 140.28 | DFT (GGA) | (36) |
| 3.2162 | 14.062 | 3.1030 |  | DFT (GGA) | (37) |
| 3.1898 | 13.9024 | 3.0982 |  | DFT (GGA) | (38) |
| **WAlB** | 3.205(1) | 13.947(1) | 3.108(1) | 138.928 | Single Crystal | (39) |
| 3.2016(3) | 13.9059(12) | 3.1020(2) | 138.1045 | Single Crystal | (2) |
| 3.2277 | 13.9945 | 3.1251 | 141.1609 | DFT (GGA) | (40) |
| 3.2219 | 14.008 | 3.1135 | 140.5197 | DFT (GGA) | (37) |
| 3.2125 | 13.947 | 3.1025 | 139.007 | DFT | (41) |

\*Three entries correspond to LPs calculated from assuming anti-ferromagnetic (AFM), non-magnetic (NM), and ferromagnetic (FM) configurations.

**Table S2**. Summary of Tpeak and SM values for oH = 2 T used to generate the convex hull plot in Figure 7 of the manuscript. Data for compounds with Tpeak 250 K to 350 K and *not* listed as having a first-order magnetic transition (i.e. FOMT) were obtained from the Supporting Information of Ref. (42). The references under columns with asterisk, contain reference numbers unchanged from Ref. (42).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Compound/Composition** | **Order** | **T (K)** | **|SM|** **(J K-1 kg-1)** | **Refs** |
| ***Fe2AlB2-based*** |
| Fe2AlB2 (Sample 1a)Fe2AlB2 (Sample 1b) | SOPT | 282 | 4.4 | (18) |
| 307 | 4.1 |
| Fe2AlB2 | SOPT | 303 | 3.4 | (20) |
| (Fe0.95Mn0.05)2AlB2 | SOPT | 288 | 2.53 |
| Fe2AlB2 | SOPT | 272 | 2.7 | (43) |
| Fe2AlB2 | SOPT | 285 | 2.4 | (26) |
| SOPT | 285 | 3.6 |
| Fe2AlB2 | SOPT | 274 | 3.78 | (28) |
| Fe2AlB2 | SOPT | 294 | 3.07 | (29) |
| Fe2AlB2 (Ga=0.05) | SOPT | 282 | 3.67 | (43) |
| Fe2AlB2 (Ga=0.1) | SOPT | 290 | 4.42 | (43) |
| Fe2AlB2 (Ge=0.1) | SOPT | 291 | 5.18 | (43) |
| Fe2AlB2 (Ga=0.05, Ge=0.05) | SOPT | 294 | 6.51 | (43) |
| **Amorphous Alloys** |
| **Compound/Composition** | **Order** | **T (K)** | **|SM|** **(J K-1 kg-1)** | **Refs\*** |
| Gd55.6Si22.2Ge22.2 |  | 267 | 0.45 | [490] |
| Fe88Zr8B4 |  | 280 | 1.3 | [541] |
| Fe87Zr6B6Cu1 |  | 300 | 1.6 | [541] |
| Fe86Zr7B6Cu1 |  | 320 | 1.6 | [541] |
| Fe70Cr8Cu1Nb5Si4B12 |  | 285 | 1 | [544] |
| Fe90Zr7B3 |  | 257 | 1.05 | [551] |
| Fe88Zr8B4 |  | 280 | 1.3 | [558] |
| Fe87Zr6B6Cu1 |  | 300 | 1.6 | [558] |
| Fe86Zr7B6Cu1 |  | 320 | 1.6 | [558] |
| Fe80B12Nb8 |  | 329 | 1.7 | [561] |
| Fe79B12Nb9 |  | 306 | 1.3 | [561] |
| Fe78B12Nb10 |  | 278 | 1.25 | [561] |
| Fe61B17Y22 |  | 295 | 1.4 | [561] |
| Fe77Ta3B10Zr9Cu1 |  | 336 | 1.47 | [563] |
| Fe75Ta5B10Zr9Cu1 |  | 313 | 1.04 | [563] |
| Fe60Ru20B20 |  | 254 | 0.79 | [570] |
| Fe83Nd5Cr8B4 |  | 322 | 1.8 | [572] |
| Fe80Nd8Cr8B4 |  | 340 | 1.8 | [572] |
| Fe78Nd10Cr8B4 |  | 345 | 1.9 | [572] |
| Fe76Nd12Cr8B4 |  | 350 | 1.9 | [572] |
| Fe73Nd15Cr8B4 |  | 350 | 1.8 | [572] |
| **Gd, Gd(Si,Ge)4** |
| **Compound/Composition** | **Order** | **T (K)** | **|SM|****(J K-1 kg-1)** | **Refs\*** |
| Gd | SOPT | 295 | 6.1 | (44) |
| Gd5Si2Ge1.98Ga0.02 | SOPT | 298 | 4 | [89] |
| Gd5Si2Ge1.96Ga0.04 | SOPT | 298 | 4 | [89] |
| Gd5Si2Ge1.94Ga0.06 | SOPT | 298 | 3.5 | [89] |
| Gd4.95Zr0.05Si2Ge2 | SOPT | 295 | 5.5 | [105] |
| Gd4.9Zr0.1Si2Ge2 | SOPT | 283 | 3.4 | [105] |
| Gd4.85Zr0.15Si2Ge2 | SOPT | 281 | 3.5 | [105] |
| Gd4.8Zr0.2Si2Ge2 | SOPT | 272 | 3.2 | [105] |
| **Heusler Alloys** |
| **Compound/Composition** | **Order** | **T (K)** | **|SM|****(J K-1 kg-1)** | **Refs\*** |
| Ni2Mn0.85Cu0.15Ga | SOPT | 333 | 1.79 | [313] |
| Ni54Mn21Ga25 | SOPT | 315 | 2.49 | [321] |
| Ni50.3Mn35.3Sn14.4 | SOPT | 320 | 1.1 | [326] |
| Ni45Mn44Sn11 | SOPT | 285 | 1.7 | [335] |
| Ni45Mn39Fe5Sn11 | SOPT | 298 | 1 | [335] |
| Ni45Mn34Fe8Sn11 | SOPT | 312 | 1.2 | [335] |
| **La(Fe,Si)13-based Compounds** |
| **Compound/Composition** | **Order** | **T (K)** | **|SM|****(J K-1 kg-1)** | **Refs\*** |
| La(Fe0.88Si0.12)13H1.0 |  | 274 | 19 | [36] |
| La(Fe0.89Si0.11)13H1.3 |  | 291 | 24 | [36] |
| La(Fe0.88Si0.12)13H1.5 |  | 323 | 19 | [36] |
| La(Fe0.9Si0.1)13H1.1 |  | 287 | 28 | [36] |
| La(Fe0.86Si0.09Co0.05)13 |  | 274 | 12 | [37] |
| LaFe11.2Co0.5Si1.3 |  | 253 | 9.2 | [40] |
| LaFe11.1Co0.6Si1.3 |  | 265 | 8.7 | [40] |
| LaFe11.2Co0.7Si1.1 |  | 270 | 9.4 | [40] |
| LaFe11.1Co0.8Si1.1 |  | 282 | 8 | [40] |
| LaFe11Co0.9Si1.1 |  | 294 | 7.4 | [40] |
| LaFe11.2Co0.7Si1.1C0.1 | SOPT | 290 | 7.8 | [43] |
| LaFe11.2Co0.7Si1.1C0.2 | SOPT | 304 | 5.2 | [43] |
| LaFe11.2Co0.7Si1.1C0.3 | SOPT | 310 | 4.13 | [43] |
| La0.7Nd0.3Fe10.7Co0.8Si1.5 |  | 280 | 7.9 | [44] |
| La(Fe0.88Si0.12)13H1.5 |  | 323 | 19 | [45] |
| La (Fe0.919Co0.081)11.7Al1.3 |  | 311 | 3.6 | [45] |
| La0.8Nd0.2(Fe0.919Co0.081)11.7Al1.3 |  | 294 | 4.6 | [45] |
| LaFe10.6Si2.4 |  | 250 | 3 | [49] |
| LaFe10.8Co0.7Si1.5C0.2 |  | 302 | 4.9 | [52] |
| La(Fe0.825Co0.07Si0.105)13 |  | 300 | 5.3 | [54] |
| La0.8Pr0.2(Fe0.825Co0.07Si0.105)13 |  | 294 | 5.4 | [54] |
| La0.6Pr0.4(Fe0.825Co0.07Si0.105)13 |  | 284 | 6.9 | [54] |
| La0.8Ce0.2Fe10.8Co0.7Si1.5 |  | 266 | 6.8 | [59] |
| LaFe11.1Co0.5Si1.5 |  | 250 | 8.1 | [61] |
| LaFe10.9Co0.7Si1.5 |  | 276 | 5.23 | [61] |
| LaFe10.85Co0.75Si1.5 |  | 281 | 5.2 | [61] |
| LaFe10.8Co0.8Si1.5 |  | 285 | 4.57 | [61] |
| La(Fe0.94Co0.06)11.9Si1.1 |  | 274 | 12.2 | [35] |
| La(Fe0.92Co0.08)11.9Si1.1 |  | 301 | 8.7 | [35] |
| LaFe10.7Co0.8Si1.5 |  | 285 | 7 | [35] |
| La0.8Pr0.2Fe10.7Co0.8Si1.5 |  | 280 | 7.2 | [35] |
| La0.6Pr0.4Fe10.7Co0.8Si1.5 |  | 274 | 7.4 | [35] |
| La0.5Pr0.5Fe10.7Co0.8Si1.5 | SOPT | 272 | 8.1 | [35] |
| La0.5Pr0.5Fe10.5Co1.0Si1.5 | SOPT | 295 | 6 | [35] |
| LaFe11.12Co0.71Al1.17 |  | 279 | 4.6 | [35] |
| **LaMnO3-based Compounds** |
| **Compound/Composition** | **Order** | **T (K)** | **|SM|****(J K-1 kg-1)** | **Refs\*** |
| La0.8Na0.2MnO3 | SOPT | 335 | 2.83 | [147] |
| La0.8Na0.15MnO3 | SOPT | 320 | 2.98 | [147] |
| La0.8Na0.1MnO3 | SOPT | 295 | 2.97 | [147] |
| La0.8Na0.05MnO3 | SOPT | 260 | 3.48 | [147] |
| La0.7Ca0.25Na0.05MnO3 |  | 254 | 4.98 | [189] |
| La0.8Na0.1Ca0.1MnO3 | SOPT | 300 | 3.1 | [192] |
| La0.8Na0.15Ca0.05MnO3 | SOPT | 320 | 2.5 | [192] |
| La0.8Na0.2MnO3 | SOPT | 330 | 2.3 | [192] |
| La0.7Ca0.25K0.05MnO3 |  | 270 | 3.95 | [193] |
| La0.7Ca0.225K0.075MnO3 |  | 281 | 3.75 | [193] |
| La0.7Ca0.20K0.10MnO3 |  | 272 | 3.49 | [193] |
| La0.7Ca0.2Ba0.1MnO3 | SOPT | 300 | 3.1 | [200] |
| La0.7Ca0.2Ba0.1MnO3 | SOPT | 281 | 3.82 | [202] |
| La0.7Ca0.2Ba0.1MnO3 | SOPT | 284 | 3.51 | [202] |
| La0.7Ca0.2Ba0.1MnO3 | SOPT | 286 | 2.94 | [202] |
| La0.7Ca0.2Ba0.1MnO3 | SOPT | 270 | 2 | [202] |
| La0.7Ca0.2Ba0.1MnO3 | SOPT | 263 | 0.92 | [202] |
| La0.8Cd0.15K0.05MnO3 | SOPT | 260 | 2.6 | [209] |
| La0.8Cd0.125K0.075MnO3 | SOPT | 273 | 2.81 | [209] |
| La0.8Cd0.1K0.1MnO3 | SOPT | 282 | 3.25 | [209] |
| La0.7Sr0.3Mn0.8Cr0.2O3 |  | 286 | 1.203 | [223] |
| La0.7Sr0.3Mn0.9Cr0.1O3 | SOPT | 326 | 1.76 | [225] |
| La0.67Ba0.33Mn0.95Sn0.05O3 | SOPT | 340 | 1.9 | [226] |
| La0.67Ba0.33Mn0.9Sn0.1O3 | SOPT | 325 | 2.3 | [226] |
| La0.67Ba0.33Mn0.85Sn0.15O3 | SOPT | 288 | 2.5 | [226] |
| La0.75Ca0.08Sr0.17MnO3 |  | 336 | 2.87 | [235] |
| La0.75Ca0.08Sr0.17Mn0.95Ga0.05 O3 |  | 285 | 1.92 | [235] |
| La0.75Ca0.08Sr0.17Mn0.925Fe0.075O3 |  | 268 | 1.38 | [236] |
| La0.7Ba0.15Sr0.15MnO3 | SOPT | 316 | 1.27 | [238] |
| La0.7Ba0.15Sr0.15Mn0.9Ga0.1O3 | SOPT | 301 | 1.16 | [238] |
| La0.7Ba0.15Sr0.15Mn0.8Ga0.2O3 | SOPT | 300 | 1.02 | [238] |
| La0.5Ce0.3Sr0.3MnO3 | SOPT | 348 | 1.65 | [248] |
| La0.4Ce0.3Sr0.3MnO3 | SOPT | 310 | 1.15 | [248] |
| La0.6Eu0.1Sr0.3MnO3 | SOPT | 343 | 1.55 | [255] |
| La0.5Eu0.2Sr0.3MnO3 | SOPT | 281 | 0.93 | [255] |
| La0.4Eu0.3Sr0.3MnO3 | SOPT | 272 | 1.17 | [255] |
| La0.47Gd0.2Sr0.33MnO3 | SOPT | 299 | 1.59 | [258] |
| La0.52Gd0.15Sr0.33MnO3 | SOPT | 343 | 1.96 | [258] |
| Pr0.55K0.05Sr0.4MnO3 | SOPT | 303 | 2.26 | [263] |
| Pr0.6Sr0.4MnO3 | SOPT | 310 | 1.95 | [270] |
| Pr0.6Sr0.35K0.05MnO3 | SOPT | 301 | 3.09 | [270] |
| Pr0.6Sr0.3K0.1MnO3 | SOPT | 296 | 2.89 | [270] |
| Pr0.6Sr0.25K0.15MnO3 | SOPT | 287 | 3.05 | [270] |
| Pr0.6Sr0.2K0.2MnO3 | SOPT | 269 | 3.2 | [270] |
| Pr0.63Sr0.37MnO3 |  | 300 | 8.52 | [149] |
| Pr0.5Sr0.5MnO3 | SOPT | 280 | 1.26 | [274] |
| Pr0.45Gd0.05Sr0.5MnO3 | SOPT | 270 | 1.25 | [274] |
| Pr0.4Gd0.1Sr0.5MnO3 | SOPT | 250 | 1.02 | [274] |
| La1.4Sr0.6Ca1.0Mn2O7 |  | 320 | 0.84 | [292] |
| La1.4Sr0.2Ca1.4Mn2O7 |  | 268 | 1.2 | [292] |
| La1.4Ca1.6Mn2O7 |  | 270 | 11.3 | [292] |

**Table S3**. Summary of Tpeak and SM values for oH = 5 T used to generate the convex hull plot in Figure 7 of the manuscript. Data for compounds with Tpeak 250 K to 350 K and *not* listed as having a first-order magnetic transition (i.e. FOMT) were obtained from the Supporting Information of Ref. (42). The references under columns with asterisk, contain reference numbers unchanged from Ref. (42).

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| ***Fe2AlB2-based*** |
| **Compound** | **Order** | **T (K)** | **|SM|****(J K-1 kg-1)** | **Refs** |
| Fe2AlB2 (Sample 1a)Fe2AlB2 (Sample 1b) | SOPT | 282 | 7.3 | (18) |
| SOPT | 307 | 7.7 |
| Fe2AlB2 | SOPT | 274 | 6.4 | (24) |
| Fe2AlB2 | SOPT | 303 | 7.2 | (20) |
| (Fe0.95Mn0.05)2AlB2 | SOPT | 290 | 5.45 |
| ***Amorphous Alloys*** |
| **Compound** | **Order** | **T****(K)** | **|SM|****(J K-1 kg-1)** | **Refs\*** |
| Gd50Co45Fe5 |  | 289 | 3.8 | [469] |
| Gd80Al8.7Fe11.3 |  | 269 | 5 | [476] |
| Gd90Al4.3Fe5.7 |  | 280 | 7.2 | [476] |
| Gd55.6Si22.2Ge22.2 |  | 267 | 0.45 | [490] |
| Fe88Zr8B4 |  | 285 | 3.3 | [546] |
| Fe87Zr6B6Cu1 |  | 300 | 3.2 | [547] |
| Fe66.3B12Si8V13.7 |  | 334 | 1.8 | [569] |
| **Gd, Gd5(Si,Ge)4 Family** |
| **Compound** | **Order** | **T (K)** | **|SM|****(J K-1 kg-1)** | **Refs\*** |
| Gd | SOPT | 295 | 10.6 | (44) |
| Gd5Si4 | SOPT | 336 | 8.2 | [72] |
| Gd5Si3. 5Ge0.5 | SOPT | 331 | 7.3 | [72] |
| Gd5Si3Ge1 | SOPT | 323 | 8.7 | [72] |
| Gd5Si2. 5Ge1.5 | SOPT | 313 | 9.4 | [72] |
| Gd5Si2.06Ge1.94 | SOPT | 306 | 9.4 | [72] |
| Gd5Si1.95Ge2.05O0.05 | SOPT | 283 | 6.5 | [75] |
| Gd5Si1.95Ge2.05O0.05 |  | 300 | 7.4 | [75] |
| Gd5Si1.95Ge2.05O0.1 | SOPT | 283 | 7 | [75] |
| Gd5Si1.95Ge2.05O0.1 |  | 302 | 6.8 | [75] |
| Gd5Ge2.1Si1.9H0.09 | SOPT | 295 | 7.2 | [76] |
| Gd5Ge2.1Si1.9H 0.5 | SOPT | 290 | 6 | [76] |
| Gd5Ge2.1Si1.9H 1.2 | SOPT | 270 | 5.5 | [76] |
| Gd5Si2Ge1.9Fe0.1 | SOPT | 320 | 7 | [77] |
| Gd5Si1.985Ge1.985Fe0.03 | SOPT | 300 | 10 | [78] |
| Gd5Si1.985Ge1.985Co0.03 | SOPT | 300 | 9 | [78] |
| Gd5Si1.985Ge1.985Ni0.03 | SOPT | 295 | 13 | [78] |
| Gd5Si1.985Ge1.985Cu0.03 | SOPT | 295 | 11 | [78] |
| Gd5Si1.97Ge1.97Ga0.06 | SOPT | 295 | 9 | [78] |
| Gd5Si1.985Ge1.985Al0.03 | SOPT | 295 | 12 | [78] |
| Gd5Si2Ge1.9Cu0.1 |  | 300 | 7 | [79] |
| Gd5Si1.99Ge1.99Mn0.02 | SOPT | 295 | 6.5 | [82] |
| Gd5Si1.975Ge1.975Mn0.05 | SOPT | 295 | 6.5 | [82] |
| Gd5Si1.96Ge1.96Mn0.08 | SOPT | 295 | 6.3 | [82] |
| Gd5Si1.95Ge1.95Mn0.1 | SOPT | 295 | 6.1 | [82] |
| Gd5Si1.93Ge1.93Mn0.14 | SOPT | 295 | 5 | [82] |
| Gd5Si1.9Ge1.9Mn0.2 | SOPT | 295 | 5.4 | [82] |
| Gd5Si2Ge2C0.1 | SOPT | 295 | 7 | [78] |
| Gd5Si1.975Ge1.975Ga0.05 | SOPT | 298 | 6.5 | [88] |
| Gd5Si1.935Ge1.935Ga0.13 | SOPT | 298 | 6.1 | [88] |
| Gd5Si2Sb2 | SOPT | 254 | 3.7 | [100] |
| Gd5Si1.5Sb2.5 | SOPT | 271 | 4.2 | [100] |
| Gd5Si1Sb3 | SOPT | 295 | 4.6 | [100] |
| **Heusler Alloys** |
| **Compound** | **Order** | **T (K)** | **|SM|****(J K-1 kg-1)** | **Refs\*** |
| Ni50Mn36Sb8Ga6 | SOPT | 280 | 2.1 | [320] |
| Ni2Mn0.7Cu0.3Ga0.9Al0.1 | SOPT | 300 | 2.2 | [323] |
| Ni50Mn37Sn13 | SOPT | 310 | 3.4 | [325] |
| Ni40Mn50Sn10 | SOPT | 278 | 2.4 | [339] |
| Ni39Mn50Co1Sn10 | SOPT | 317 | 2.2 | [339] |
| Ni38Mn50Co2Sn10 | SOPT | 340 | 3.9 | [339] |
| Ni50Mn36Sn13Ge1 | SOPT | 314 | 2.4 | [356] |
| Ni50Mn36Sn13Ge2 | SOPT | 310 | 2.4 | [356] |
| Ni50Mn37Sn13 | SOPT | 300 | 5.7 | [358] |
| Ni49Pr1Mn37Sn13 | SOPT | 295 | 4.1 | [358] |
| Ni47Pr3Mn37Sn13 | SOPT | 305 | 1.8 | [358] |
| Ni50Mn35In15 | SOPT | 316 | 5.7 | [361] |
| Ni50Mn34.95In15.05 | SOPT | 328 | 6.6 | [361] |
| Ni50Mn34.8In15.2 | SOPT | 328 | 7 | [361] |
| Ni50Mn34In16 | SOPT | 325 | 6.8 | [361] |
| Ni47.74Mn37.06In15.20 | SOPT | 294 | 6.45 | [370] |
| Ni50Co1Mn34In15 | SOPT | 330 | 6 | [380, 381] |
| Ni44Cu2Mn43In11 | SOPT | 325 | 4 | [383] |
| Ni50Mn35In14Si1 | SOPT | 328 | 6.6 | [393] |
| Ni50Mn35In13Si2 | SOPT | 300 | 5.9 | [393] |
| Ni50Mn35In12Si3 | SOPT | 283 | 4.8 | [393] |
| Ni50Mn35In11Si4 | SOPT | 280 | 3.6 | [393] |
| Ni50Mn35In10Si5 | SOPT | 281 | 3.7 | [393] |
| Ni50Mn35In14Si1 | SOPT | 307 | 6.6 | [396] |
| Ni50Mn35In14Ge1 | SOPT | 310 | 6 | [396] |
| Ni50Mn35In14Al1 | SOPT | 320 | 4.7 | [396] |
| Ni50Mn34In16 | SOPT | 308 | 5 | [397] |
| Ni50Mn34In14Ga2 | SOPT | 293 | 5 | [397] |
| Ni48.4Co1.9Mn34.2In13.8Ga1.7 | SOPT | 335 | 5.7 | [399] |
| Ni50Mn35In14B1 | SOPT | 326 | 7 | [402] |
| Ni50Mn35In13.9B1.1 | SOPT | 320 | 6 | [402] |
| Ni50.51Mn34.34In14.14B1.01 | SOPT | 320 | 6.7 | [403] |
| Ni50.51Mn33.08Cu1.26In14.14B1.01 | SOPT | 318 | 7.27 | [403] |
| Ni50.51Mn34.34In12.12Cu2.02B1.01 | SOPT | 314 | 5.98 | [403] |
| Fe2MnSi0.5Ge0.5 | SOPT | 260 | 1.7 | [416] |
| Co50Cr25Al25 | SOPT | 328.5 | 2.55 | [424] |
| **La(Fe,Si)13-based Compositions** |
| **Compound** | **Order** | **T (K)** | **|SM|****(J K-1 kg-1)** | **Refs\*** |
| La(Fe0.88Si0.12)13H1.0 |  | 274 | 23 | [36] |
| La(Fe0.89Si0.11)13H1.3 |  | 291 | 28 | [36] |
| La(Fe0.88Si0.12)13H1.5 |  | 323 | 23 | [36] |
| La(Fe0.9Si0.1)13H1.1 |  | 287 | 31 | [36] |
| La(Fe0.86Si0.09Co0.05)13 |  | 274 | 20 | [37] |
| La(Fe0.96Co0.04)11.44Al1.56 |  | 250 | 5.49 | [39] |
| La(Fe0.92Co0.08)11.44Al1.56 |  | 320 | 4.65 | [39] |
| La(Fe0.88Co0.12)11.44Al1.56 |  | 370 | 4.75 | [39] |
| LaFe11.2Co0.5Si1.3 |  | 253 | 15.5 | [40] |
| LaFe11.1Co0.6Si1.3 |  | 265 | 15 | [40] |
| LaFe11.2Co0.7Si1.1 |  | 270 | 16.5 | [40] |
| LaFe11.1Co0.8Si1.1 |  | 282 | 15 | [40] |
| LaFe11Co0.9Si1.1 |  | 294 | 13.5 | [40] |
| LaFe11.2Co0.7Si1.1C0.1 | SOPT | 290 | 14.5 | [43] |
| LaFe11.2Co0.7Si1.1C0.2 | SOPT | 304 | 9.8 | [43] |
| LaFe11.2Co0.7Si1.1C0.3 | SOPT | 310 | 8.3 | [43] |
| La0.7Nd0.3Fe10.7Co0.8Si1.5 |  | 280 | 15 | [44] |
| LaFe10.6Si2.4 |  | 250 | 4.8 | [49] |
| La(Fe0.94Co0.06)11.9Si1.1 |  | 274 | 19.7 | [35] |
| La(Fe0.92Co0.08)11.9Si1.1 |  | 301 | 15.6 | [35] |
| LaFe10.7Co0.8Si1.5 |  | 285 | 13.5 | [35] |
| La0.8Pr0.2Fe10.7Co0.8Si1.5 |  | 280 | 13.6 | [35] |
| La0.6Pr0.4Fe10.7Co0.8Si1.5 |  | 274 | 14.2 | [35] |
| La0.5Pr0.5Fe10.7Co0.8Si1.5 | SOPT | 272 | 14.6 | [35] |
| La0.5Pr0.5Fe10.5Co1.0Si1.5 | SOPT | 295 | 11.7 | [35] |
| LaFe11.12Co0.71Al1.17 |  | 279 | 9.1 | [35] |
| La0.8Ce0.2Fe10.9Co0.8Si1.3 |  | 269 | 15 | [64] |
| La0.8Ce0.2Fe10.7Co1.0Si1.3 |  | 291 | 15 | [64] |
| La0.8Ce0.2Fe10.5Co1.2Si1.3 |  | 313 | 14 | [64] |
| La0.7(Ce,Pr,Nd)0.3Fe11.6Si1.4H1.6 |  | 379 | 25.4 | [66] |
| **LaMnO3-based Compounds** |
| **Compound** | **Order** | **T (K)** | **|SM|****(J K-1 kg-1)** | **Refs\*** |
| La0.7Sr0.3MnO3 | SOPT | 365 | 4.44 | [176] |
| La0.67Sr0.33MnO3 | SOPT | 370 | 5.15 | [177] |
| La0.67Ba0.33MnO3 |  | 292 | 1.48 | [149, 161] |
| La0.65Ca0.30Na0.05MnO3 | SOPT | 277 | 6.98 | [190] |
| La0.65Ca0.25Na0.10MnO3 | SOPT | 279 | 4.76 | [190] |
| La0.65Ca0.20Na0.15MnO3 | SOPT | 314 | 4.96 | [190] |
| La0.65Ca0.15Na0.20MnO3 | SOPT | 317 | 4.65 | [190] |
| La0.7Ca0.25Sr0.05MnO3 |  | 275 | 10.5 | [149, 197] |
| La0.7Ca0.2Sr0.1MnO3 |  | 308 | 7.45 | [149, 197] |
| La0.7Ca0.1Sr0.2MnO3 |  | 340 | 6.97 | [149, 197] |
| La0.7Ca0.05Sr0.25MnO3 |  | 341 | 6.86 | [149, 197] |
| La0.65Bi0.05Sr0.3MnO3 | SOPT | 353 | 5.02 | [176] |
| La0.6Bi0.1Sr0.3MnO3 | SOPT | 334 | 4.81 | [176] |
| La0.5Bi0.2Sr0.3MnO3 | SOPT | 296 | 4.21 | [176] |
| La0.67Ba0.18Zn0.15MnO3 | SOPT | 260 | 3.39 | [208] |
| La0.7Na0.05Sr0.25MnO3 | SOPT | 363 | 4.34 | [212] |
| La0.67Ca0.33Mn0.97V0.03O3 |  | 277.5 | 6.7 | [213] |
| La0.67Ca0.33Mn0.94V0.06O3 |  | 277.5 | 6.29 | [213] |
| La0.67Ca0.33Mn0.9V0.1O3 |  | 277.5 | 6.13 | [213] |
| La0.67Ca0.33Mn0.85V0.15O3 |  | 287.5 | 4.44 | [213] |
| La0.67Ca0.33Mn0.75V0.25O3 |  | 287.5 | 3.13 | [213] |
| La0.67Ca0.33Mn0.5V0.5O3 |  | 287.5 | 2.94 | [213] |
| La0.75Sr0.25Mn0.8Cr0.2O3 | SOPT | 278 | 3.9 | [216] |
| La0.75Sr0.25Mn0.75Cr0.25O3 | SOPT | 253 | 4.2 | [216] |
| La0.7Ca0.2Sr0.1MnO3 | SOPT | 294 | 6.2 | [217] |
| La0.7Ca0.2Sr0.1Mn0.95Co0.05O3 | SOPT | 280 | 4.6 | [217] |
| La0.7Ca0.2Sr0.1Mn0.9Co0.1O3 | SOPT | 255 | 3.8 | [217] |
| La0.8Ca0.1Ba0.1MnO3 | SOPT | 282 | 3.2 | [218] |
| La0.67Ba0.33Mn0.98Ti0.02O3 | SOPT | 314 | 3.24 | [227] |
| La0.67Ba0.33MnO3 |  | 332 | 3.51 | [228] |
| La0.67Ba0.33Mn0.95Fe0.05O3 |  | 271 | 2.54 | [228] |
| La0.67Sr0.22Ba0.11MnO3 | SOPT | 360 | 2.46 | [229] |
| La0.67Sr0.22Ba0.11Mn0.9Fe0.1O3 | SOPT | 268 | 2.43 | [229] |
| La0.67Ba0.22Sr0.11Mn0.9Ti0.1O3 | SOPT | 280 | 1.33 | [231] |
| La0.8Ba0.1Ca0.1Mn0.97Fe0.03O3 | SOPT | 281 | 4.28 | [237] |
| La0.6Pr0.1Sr0.3MnO3 | SOPT | 360 | 3.32 | [243] |
| La0.6Pr0.1Sr0.3Mn0.95Ru0.05O3 | SOPT | 350 | 3.11 | [243] |
| La0.6Pr0.1Sr0.3Mn0.85Ru0.15O3 | SOPT | 344 | 2.57 | [243] |
| La0.57Nd0.1Sr0.33Mn0.95Sn0.05 O3 |  | 282 | 2.8 | [245] |
| La0.67Pb0.33MnO3 | SOPT | 360 | 4.26 | [246] |
| La0.52Dy0.15Pb0.33MnO3 | SOPT | 290 | 3.51 | [246] |
| La0.47Dy0.2Pb0.33MnO3 | SOPT | 277 | 2.3 | [246] |
| La0.65Eu0.05Sr0.3Mn0.95Cr0.05 O3 | SOPT | 338 | 4.04 | [257] |
| La0.65Eu0.05Sr0.3Mn0.9Cr0.1O3 | SOPT | 310 | 3.35 | [257] |
| La0.65Eu0.05Sr0.3Mn0.85Cr0.15 O3 | SOPT | 278 | 2.65 | [257] |
| Pr0.5Y0.1Sr0.4MnO3 | SOPT | 310 | 3.54 | [261] |
| Pr0.5Eu0.1Sr0.4MnO3 | SOPT | 270 | 3.81 | [261] |
| Pr0.6Ca0.1Sr0.3MnO3 |  | 256 | 3.64 | [267] |
| Pr0.6Ca0.1Sr0.3Mn0.925Fe0.075O3 |  | 270 | 3.12 | [267] |
| Pr0.63Sr0.37MnO3 |  | 300 | 8.52 | [149] |
| Pr0.55Sr0.45MnO3 |  | 304 | 3.32 | [275] |
| **Laves Phases RE(TM)2** |
| **Compound** | **Order** | **T (K)** | **|SM|****(J K-1 kg-1)** | **Refs\*** |
| Gd(Co0.35Mn0.65)2 | SOPT | 300 | 3.4 | [4] |
| Gd(Co0.3Mn0.7)2 | SOPT | 270 | 3.8 | [4] |
| Tb(Co0.9Mn0.1)2 | SOPT | 308 | 3.2 | [17] |



**Figure S1**. Fitting Cp/Tvs. T2 for Fe2AlB2 powders, using cp vs. T data obtained from authors of Ref. (18)

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