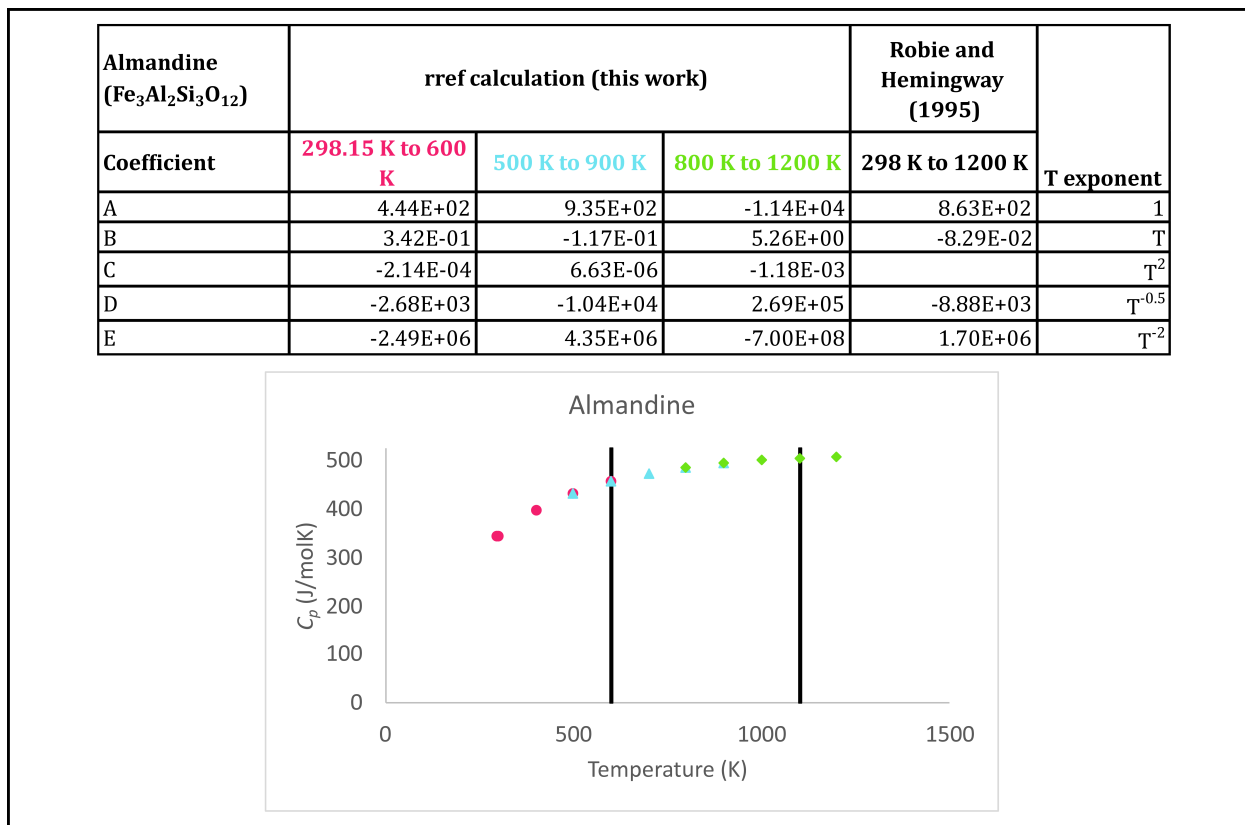
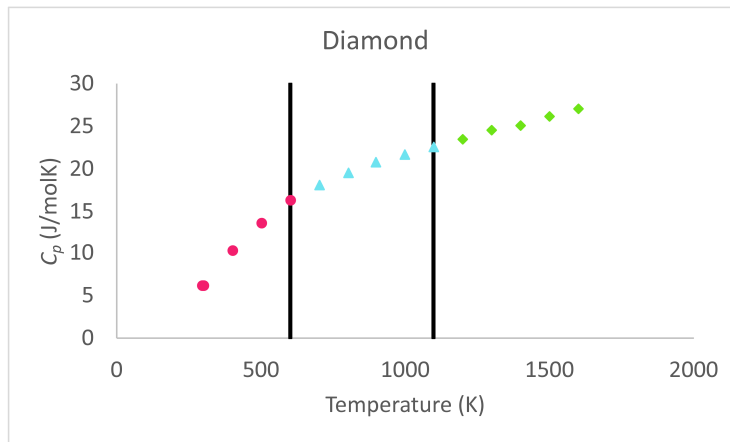


Supplementary Information

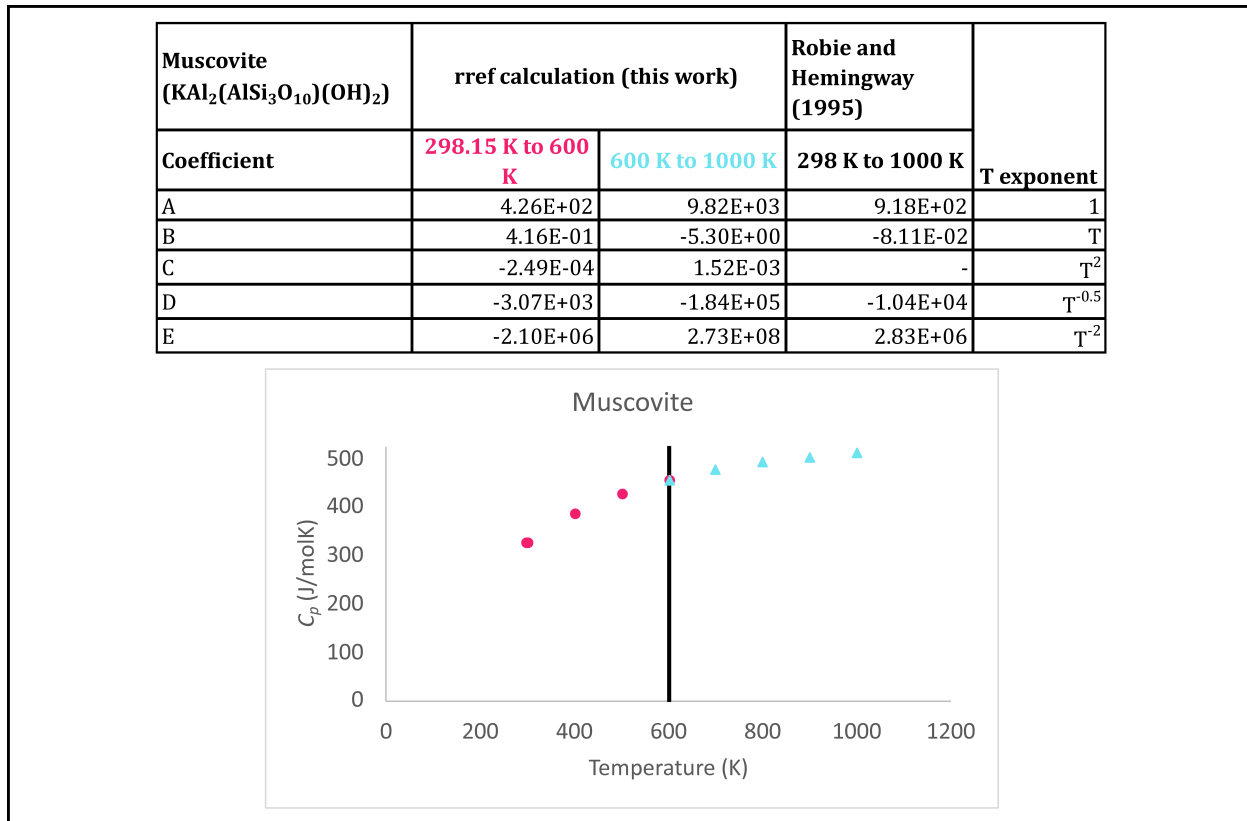


SI Figure 1: Three-domain (denoted by black bars) heat capacity coefficients for almandine garnet calculated using rref compared to published results. The calculated and reported coefficients are taken using published C_p values from 298.15 K, 300 K, 400 K, 500 K, and 600 K for the first domain (red dots in figure and red text in table). Similarly, C_p from 500 K, 600 K, 700 K, 800 K, and 900 K were used for the second domain rref calculation (blue triangles in figure and blue text in table). Finally, the third domain consists of C_p values from 800 K, 900 K, 1000 K, 1100 K, and 1200 K (green triangles in figure and green text in table). All C_p from values which were used for rref coefficient calculation are those found in Robie and Hemingway (1995). Note that these same authors give only a single suite of coefficients for the full range from 298 K to 1200 K. These same authors do not provide coefficients pertaining to T^2 .

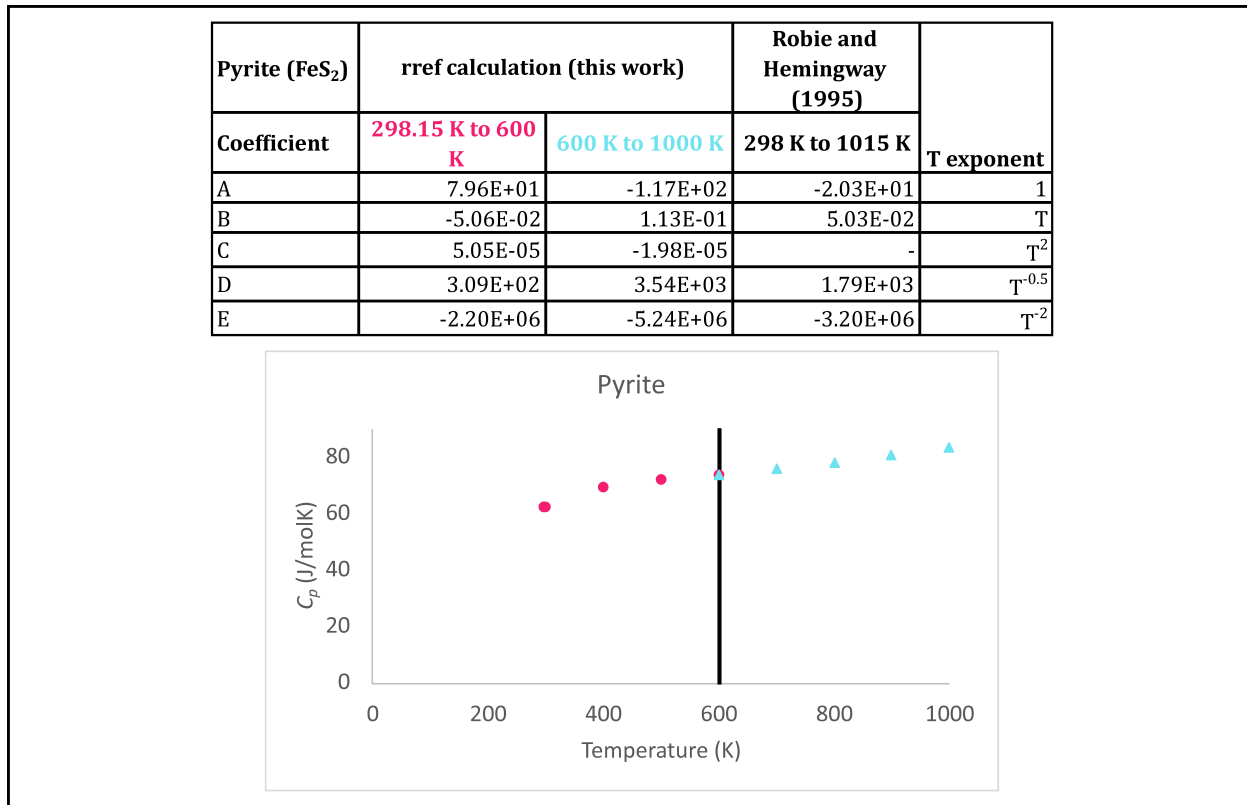
Diamond (C)	rref calculation (this work)			Robie and Hemingway (1995)	T exponent
Coefficient	298.15 K to 600 K	700 K to 1100 K	1200 K to 1600 K	298 K to 1800 K	
A	1.27E+02	9.23E+01	1.10E+04	9.85E+01	1
B	-6.43E-02	-3.59E-02	-4.04E+00	-3.66E-02	T
C	2.40E-05	1.15E-05	7.32E-04	1.10E-05	T ²
D	-2.10E+03	-1.48E+03	-2.70E+05	-1.66E+03	T ^{-0.5}
E	1.53E+06	5.83E+05	8.11E+08	1.22E+06	T ⁻²



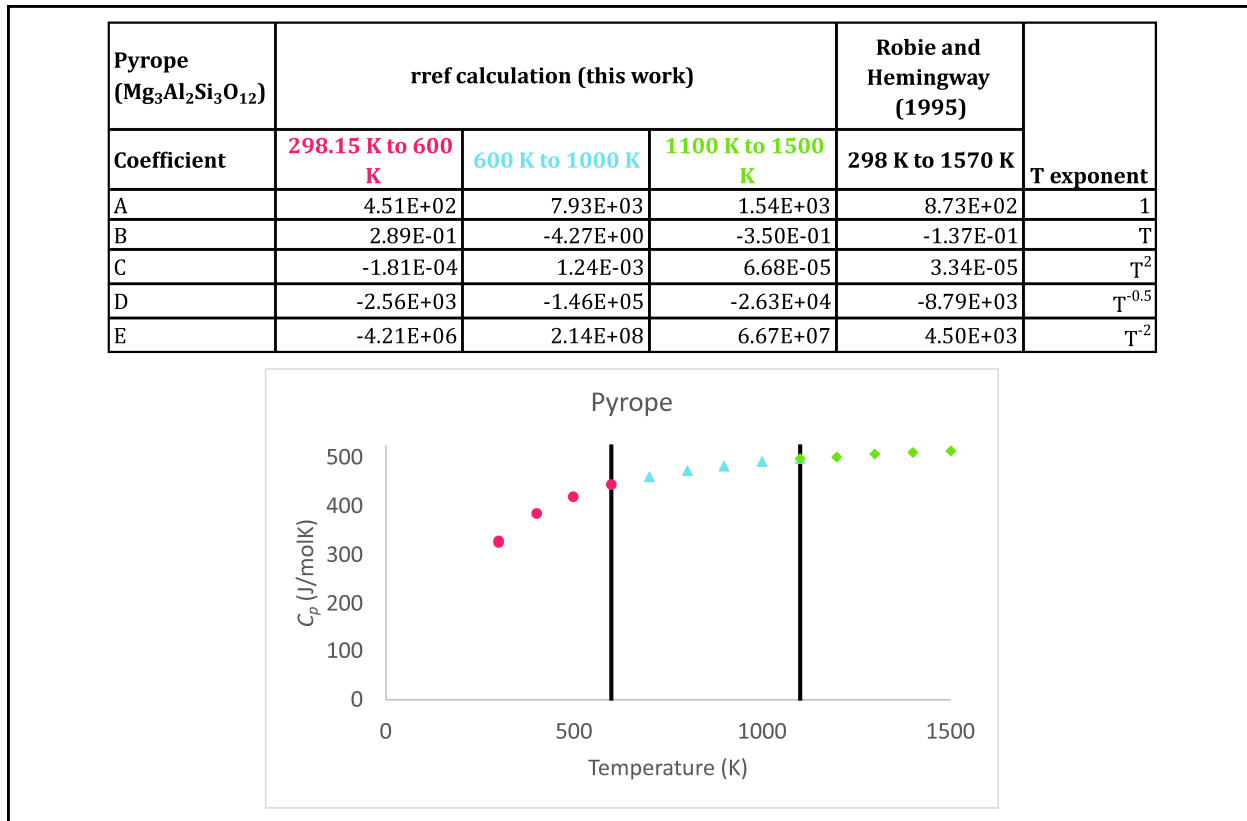
SI Figure 2: Three-domain (denoted by black bars) heat capacity coefficients for diamond calculated using rref compared to published results. The calculated and reported coefficients are taken using published C_p values from 298.15 K, 300 K, 400 K, 500 K, and 600 K for the first domain from 298.15 K to 600 K (red dots in figure and red text in table). Similarly, C_p from 700 K, 800 K, 900 K, 1000 K, and 1100 K were used for the second domain rref calculation (blue triangles in figure and blue text in table). Finally, the third domain consists of C_p values from 1200 K, 1300 K, 1400 K, 1500 K, and 1600 K (green diamonds in figure and green text in table). All C_p from values which were used for rref coefficient calculation are those found in Robie and Hemingway (1995). Note that these same authors give only one suite of coefficients for the full range from 298 K to 1800 K.



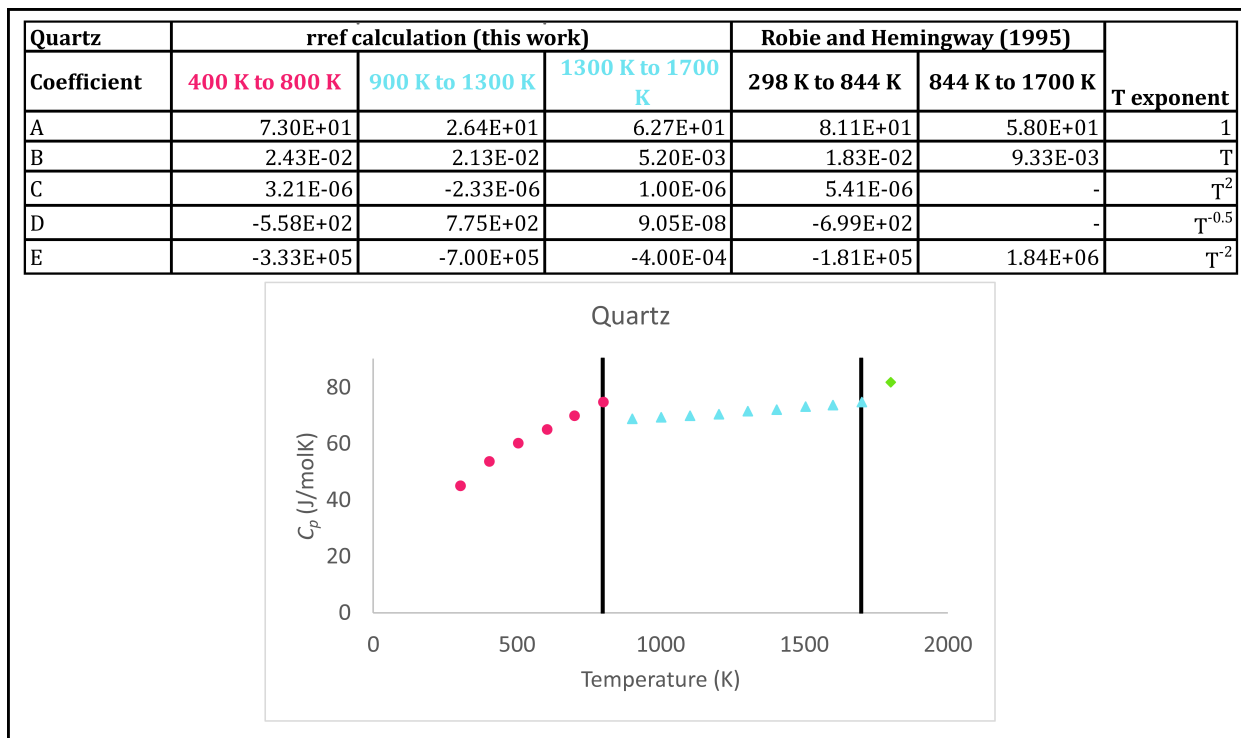
SI Figure 3: Two-domain (denoted by black bars) heat capacity coefficients for muscovite calculated using rref compared to published results. The calculated and reported coefficients are taken using published C_p values from 298.15 K, 300 K, 400 K, 500 K, and 600 K for the first domain from 298.15 K to 600 K (red dots in figure and red text in table). Similarly, C_p from 600 K, 700 K, 800 K, 900 K, and 1000 K were used for the second domain rref calculation (blue triangles in figure and blue text in table). All C_p from values which were used for rref coefficient calculation are those found in Robie and Hemingway (1995). Note that these same authors give only one suite of coefficients for the full range from 298 K to 1000 K, and do not give a coefficient value for the T² term.



SI Figure 4: Two-domain (denoted by black bars) heat capacity coefficients for pyrite calculated using rref compared to published results. The calculated and reported coefficients are taken using published C_p values from 298.15 K, 300 K, 400 K, 500 K, and 600 K for the first domain from 298.15 K to 600 K (red dots in figure and red text in table). Similarly, C_p from 600 K, 700 K, 800 K, 900 K, and 1000 K were used for the second domain rref calculation (blue triangles in figure and blue text in table). All C_p from values which were used for rref coefficient calculation are those found in Robie and Hemingway (1995). Note that these same authors give only one suite of coefficients for the full range from 298 K to 1015K, and do not give a coefficient value for the T² term.

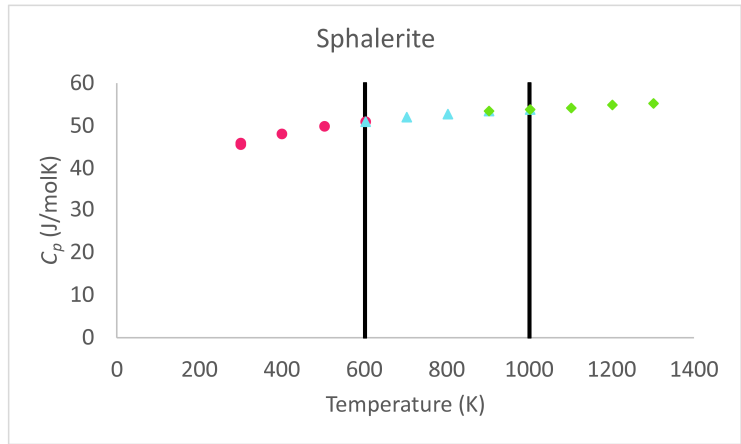


SI Figure 5: Three-domain (denoted by black bars) heat capacity coefficients for pyrope garnet calculated using rref compared to published results. The calculated and reported coefficients are taken using published C_p values from 298.15 K, 300 K, 400 K, 500 K, and 600 K for the first domain (red dots in figure and red text in table). Similarly, C_p from 600 K, 700 K, 800 K, 900 K, and 1000 K were used for the second domain rref calculation (blue triangles in figure and blue text in table). Finally, the third domain consists of C_p values from 1100 K, 1200 K, 1300 K, 1400 K, and 1500 K (green triangles in figure and green text in table). All C_p from values which were used for rref coefficient calculation are those found in Robie and Hemingway (1995). Note that these same authors give only a single suite of coefficients for the full range from 298 K to 1570 K.



SI Figure 6: Three-domain (denoted by black bars) heat capacity coefficients for quartz calculated using rref compared to published results. The calculated and reported coefficients are taken using published C_p values from 400 K, 500 K, 600 K, 700 K, and 800 K for the first domain from 400 K to 800 K (red dots in figure and red text in table). Similarly, C_p from 900 K, 1000 K, 1100 K, 1200 K, and 1300 K were used for the second domain rref calculation (blue triangles in figure and blue text in table). Finally, the third domain is a subinterval, consisting of C_p values from 1300 K, 1400 K, 1500 K, 1600 K, and 1700 K (blue triangles in figure and blue text in table). All C_p from values which were used for rref coefficient calculation are those found in Robie and Hemingway (1995). Note that these same authors give coefficients for the range of 298 K to 844 K, and for 844 K to 1700 K, but do not provide coefficients pertaining to T^2 or $T^{-0.5}$ for the upper temperature interval.

Sphalerite (ZnS)	rref calculation (this work)			Robie and Hemingway (1995)	T exponent
Coefficient	298.15 K to 600 K	600 K to 1000 K	900 K to 1300 K	298 K to 1300 K	
A	4.63E+01	2.28E+02	3.96E+01	6.15E+01	1
B	1.60E-02	-9.64E-02	9.00E-03	7.63E-04	T
C	-7.52E-06	2.83E-05	-1.55E-06	-	T ²
D	-3.42E+01	-3.50E+03	2.71E+02	-2.60E+02	T ^{-0.5}
E	-2.36E+05	5.00E+06	-1.69E+06	-7.96E+04	T ⁻²



SI Figure 7: Three-domain (denoted by black bars) heat capacity coefficients for sphalerite. The calculated and reported coefficients are taken using published C_p values from 298.15 K, 300 K, 400 K, 500 K, and 600 K for the first domain from 400 K to 800 K (red dots in figure and red text in table). Similarly, C_p from 600 K, 700 K, 800 K, 900 K, and 1000 K were used for the second domain rref calculation (blue triangles in figure and blue text in table). Finally, the third domain consists of C_p values from 900 K, 1000 K, 1100 K, 1200 K, and 1300 K (green triangles in figure and green text in table). All C_p from values which were used for rref coefficient calculation are those found in Robie and Hemingway (1995). Note that these same authors give coefficients for the range of 298 K to 844 K, and for 844 K to 1700 K, but do not provide a coefficient pertaining to the T^2 term.