Assignment 1

Given below are the thermodynamic functions for cementite (Fe3C).

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| (J/mfu) | T range (K) |
| +11369.937746−5.641259263\**T*−8.333\*10−6\**T*\*\*4 | 0 < *T* < 43 |
| +11622.647246−59.537709263\**T*+15.74232\**T*\*ln(*T*) −0.27565\**T*2 | 0 < *T* < 163 |
| −10195.860754+690.949887637\**T*−118.47637\*T\*ln(*T*) −0.0007\**T*2+590527/*T* | 0 < *T* < 2000 |

Ferromagnetic contribution to thermodynamic properties of cementite can be described using following parameters. *T*C = 485 K; *f* = 0.28; β = 1.008.

1. Write a computer program to calculate enthalpy, entropy, and heat capacity of cementite at any given temperature. Report values of these properties at 200, 400, and 500 K.
2. Plot its heat capacity from 0 to 1500 K.
3. What is the Gibbs energy due to magnetic ordering at the critical temperature?

Due date: 12-March-2018