American Mineralogist, Volume 97, pages 657–660, 2012

The heat capacity of fayalite at high temperatures

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Abstract

The high-temperature heat capacity of fayalite was reinvestigated using drop and differential scanning calorimetry. The resulting data together with drop calorimetry data taken from the literature were analyzed yielding C_P J/(mol·K) = $-584.388 + 129\,440 \cdot T^{-1} - 3.84956 \cdot 10^7 \cdot T^{-2} + 4.10143 \cdot 10^9 \cdot T^{-3} + 98.4368 \cdot \ln(T)$. This new C_P polynomial is recommended for calculating phase equilibria involving fayalite at mantle conditions. Using thermal expansion coefficient and isothermal bulk modulus data from the literature, the isochoric heat capacity was calculated resulting in C_V J/(mol·K) = $-217.137 + 63\,023.1 \cdot T^{-1} - 2.15863 \cdot 10^7 \cdot T^{-2} + 2.23513 \cdot 10^9 \cdot T^{-3} + 51.7620 \cdot \ln(T)$.

Keywords: Specific heat, ferrous orthosilicate, high temperature, heat content