Thermophysical Properties of the Vitreous and Crystalline Phases of Alkali Disilicates

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Heat capacities of the crystalline and vitreous phases of lithium, sodium and potassium disilicates ($Li_2O{\cdot}2SiO_2$; $Na_2O{\cdot}2SiO_2$; $K_2O{\cdot}2SiO_2$) were determined using equilibrium adiabatic calorimetry from 5 to 350 K. The data was adjusted to end member composition and the deviation between the heat capacity of the vitreous phase and the crystalline phase for the compounds was found to be a Schottky-like function. The temperature dependence of the heat capacities for both phases was interpreted using the approach of S. W. Barber. Molar thermophysical properties were also calculated. The values at 298.15 K of $\{S_o\text{-}S_o(0)\}/R$ for the stiochiometric composition of the alkali disilicate, vitreous, crystal are: Li, 16.30, 14.65; Na, 20.67, 19.47; and K, 23.26, 23.00.