Empirical Equation of State for Alkali Halides at High Pressure

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Lindemann's criterion of melting is utilized to develop the empirical equation of state to estimate the melting curves at high pressure for *NaCl, KCl, RbCl, NaBr, KBr, CsBr, NaI, KI, CsI, LiF*, *NaF* and *KF*. The solid-liquid phase transition i.e. melting of halides at high pressure is of considerable significance to understand the structural phase transformation and the information regarding the role played by thermodynamic functions. In particular, the molten salt phase diagrams are of central importance in metallurgy and material science due to their industrial applications. The basic inputs for our formulation are the bulk modulus and the Grüneisen parameter at the ambient conditions. Under simple conditions, the present formalism reduces to the well- known Simon's relation. Most of the melting curves (T_m-*P*) exhibit nonlinear variation with increasing pressure having curvatures downwards. Contrary to this, T_m-*P* melting curves of *CsBr* and *LiF* show nonlinear variation with curvatures upwards. The gradients, *dT/dP* are found to be quite different for different halides. The computed curves of Tm-P variation are in very good agreement with the available experimental data.