**Abstract**

In the present paper, we have investigated SmAlO3 for their thermodynamic properties under effect of pressure and temperature by employing density functional theory (DFT) and quasi-harmonic Debye model. The various thermodynamic properties like Bulk Modulus, entropy, internal energy, Helmholtz free energy, Debye temperature, coefficient of thermal expansion, Grüneisen parameter and heat capacities of the ternary alloy are calculated. We found that Bulk Modulus, Debye temperature and Helmholtz free energy have decreasing trend with rise of temperature while their values have increasing behavior with rise of pressure. The internal energy of the system almost remains same with variation in pressure but temperature effectively increasing it. Our results are in good agreement with available data at low-temperature limit.