Pressure Dependent Ground State, Elastic and Thermo Physical Properties of Europium and Lanthanum Mixed Alloy Chalcogenides EuxLa1-xS (x = 0, 0.45, 0.85, 1).

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**Abstract**. The pressure-dependent elastic, mechanical and thermo physical properties of rock salt (*B*1) to CsCl (*B*2) structures in Europium chalcogenides EuxLa1-xS (x = 0, 0.45, 0.85, 1) are presented using model inter-atomic potential with inclusion of zero point energy. As the doping concentration of Europium increases transition pressure decreases with large volume collapse. Calculated transition pressure for EuS, Eu0.45La0.55S, Eu0.85La0.15S, LaS are 21.5GPa, 25.6GPa, 23.6GPa, 27.5GPa respectively. Furthermore, the increment in doping concentration of Europium leads the material EuxLa1-xS (x = 0, 0.45, 0.85, 1) towards more brittle nature Enhancement in Debye Temperature (*θD*) in *B*1 phase at higher pressure indicates the mechanical stiffening of lattice. Pugh’s and Poisson’s ratio indicate brittle nature of material EuxLa1-xS (x = 0, 0.45, 0.85, 1). The present results are in general in good agreement with experimental and other theoretical techniques available for the end point members (x = 0 and x = 1).

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