

Study of Elastic Properties of Mantle Solids & Variations of Density (ρ) of Earth with Depth (r)

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Abstract: *In the present study, there is now some knowledge on the elastic characteristics of the key rock-forming minerals in the mantle. Gruneisen parameter is reasonably constant from material to material and temperature independent. The majority of measurements are taken under settings that are very different from the pressure and temperature conditions in the deep mantle. This is useful because density fluctuations with temperature, pressure, composition, and phase are pretty well understood. At high temperatures, the elastic characteristics are mostly determined by volume due to thermal expansion. Because the lower mantle is under simultaneous high pressure and high temperature, it is unclear if the standard high-temperature limit simplifications are necessarily accurate.*

Keywords: Anderson-Gruneisen parameter, isothermal bulk modulus, elastic properties

REFERENCES

- [1]. B. B. Karki, L. Stixrude, and R. M. Wentzovitch, Rev. Geophys. 39, 507 (2001).
- [2]. M.Kumar, Physica B, 311, 340-347 (2002).
- [3]. M.Kumar, V. Pal, B.R.K.Gupta. Phys. Chem. Minrals .25 (1998) 27
- [4]. M.Kumar and S.S.Bedi.Phys.,Stat.,Sol. (B) 196, 303 (1996).
- [5]. A.M. Dziewonski and O.L.Anderson,25, 297-356 (1981)
- [6]. A.Chopelas and R.Boehler, Geo phys. Res. Letters, 19 (1992) 983.
- [7]. G.Master and P.M. Shearer A hand book of physical constants.88-103 (1995)
- [8]. J.B.Gaherty,T.H.Jordan and L.S. Gee. J. Geophys. Res.,101,22291-22309 (1996).
- [9]. P.M.Shearervol 117. pp .115-131 (2000).
- [10]. D.G Isaak, R.E. Cohen,and M.E. Mehl. J .Geophysics., Res.95.7055-7067 (1990).
- [11]. B.B.Karki, L.Stixrude and R.M.Wentzovitch. Geo phys. Res.39,4 (2001) 507-534.
- [12]. M.Singh, P.P.Singh, B.R.K.Gupta and M.kumar High Temperature-High Pressure ,33 (2001) 199 .
- [13]. J.F.Nye Physicalpropertiesofcrystal:Their Representation by tensor and metrices,oxford univ.1985.
- [14]. R.M.Wentzovitch,,N .Ross and G.D.Price Earth Planet .Inter.,90,101-112 (1995).
- [15]. J.P.Watt,G.F.Davies and R.J. O'Connell. Rev.,Geophys., 14, 541-563 (1976).
- [16]. W.B. Holzapfel, High Pressure Res. 22 (2002) 209.
- [17]. L.Stixrude, R.E.Cohen and R .J.Hemley,Rev.Mineral.,37, 639-671 (1998).