

the effect of composition on the overlap field in feldspars.

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## REFERENCES

- Anderson, O. L., Effect of pressure on glass structure, *J. Appl. Phys.*, **27**, 943-949, 1956.
- Anderson, O. L., The use of ultrasonic measurements under modest pressure to estimate compression at high pressure, *J. Phys. Chem. Solids*, **27**, 547-565, 1966.
- Anderson, O. L., and E. Schreiber, The relation between refractive index and density of minerals related to the earth's mantle, *J. Geophys. Res.*, **70**, 1463-1471, 1965.
- Arndt, J., and D. Stöffler, Evidence of quasi-crystalline atomic arrangements in silica glass densified at very high pressures, *Naturwiss.*, **55**, 226-227, 1968.
- Birch, F., Compressibility; Elastic constants, in *Handbook of Physical Constants*, edited by S. P. Clark, *Geol. Soc. Am. Mem.*, **97**, 97-173, 1966.
- Birch, F., and R. B. Dow, Compressibility of rocks and glasses at high temperatures and pressures: Seismological application, *Bull. Geol. Soc. Am.*, **47**, 1235-1255, 1936.
- Birch, F., and R. R. Law, Measurement of compressibility at high pressures and high temperatures, *Bull. Geol. Soc. Am.*, **46**, 1219-1250, 1935.
- Boyd, F. R., and J. L. England, Apparatus for phase-equilibrium measurements at pressures up to 50 kilobars and temperatures up to 1750°C, *J. Geophys. Res.*, **65**, 741-748, 1960.
- Boyd, F. R., and J. L. England, Effect of pressure on the melting of diopside,  $\text{CaMgSi}_2\text{O}_6$ , and albite,  $\text{NaAlSi}_3\text{O}_8$ , in the range up to 50 kilobars, *J. Geophys. Res.*, **68**, 311-323, 1963.
- Bridgman, P. W., The compression of 39 substances to 100,000 kg/cm<sup>2</sup>, *Proc. Am. Acad. Arts Sci.*, **76**, 55-70, 1948.
- Bridgman, P. W., and I. Simon, Effects of very high pressures on glass, *J. Appl. Phys.*, **24**, 405-413, 1953.
- Brown, W. F., Dielectrics, in *Encyclopedia of Physics*, edited by S. Flugge, vol. 17, pp. 114-119, Springer-Verlag, Berlin, 1956.
- Clark, S. P., Viscosity, in *Handbook of Physical Constants*, edited by S. P. Clark, *Geol. Soc. Am. Mem.*, **97**, 291-298, 1966.
- Cohen, H. M., and R. Roy, Effects of ultrahigh pressures on glass, *J. Am. Ceram. Soc.*, **44**, 523-524, 1961.
- Cohen, H. M., and R. Roy, Reply to "Comments on 'Effects of ultrahigh pressures on glass,'" *J. Am. Ceram. Soc.*, **45**, 398-399, 1962.
- Cohen, H. M., and R. Roy, Densification of glass at very high pressure, *Phys. Chem. Glasses*, **6**, 149-161, 1965.
- Davies, R. O., and G. O. Jones, Thermodynamic and kinetic properties of glasses, *Advan. Phys.*, **2**, 370-410, 1953.
- Jones, F. O., and F. E. Simon, What is a glass?, *Endeavour*, **8**, 175-181, 1949.
- Kennedy, G. C., G. J. Wasserburg, H. C. Heard, and R. C. Newton, The upper three-phase region in the system  $\text{SiO}_2\text{-H}_2\text{O}$ , in *Progress in Very High Pressure Research*, edited by F. P. Bundy, W. R. Hibbard, and H. M. Strong, pp. 28-45, John Wiley, New York, 1961.
- Kennedy, G. C., G. J. Wasserburg, H. C. Heard, and R. C. Newton, The upper three-phase region in the system  $\text{SiO}_2\text{-H}_2\text{O}$ , *Am. J. Sci.*, **260**, 501-521, 1962.
- Mackenzie, J. D., High-pressure effects on oxide glasses, **2**, Subsequent heat treatment, *J. Am. Ceram. Soc.*, **46**, 470-476, 1963.
- Mott, N. F., and R. W. Gurney, *Electronic Processes in Ionic Crystals*, pp. 13-19, Clarendon Press, Oxford, 1940.
- Reitzel, J., I. Simon, and J. Walker, New methods for measuring linear compressibility of solids, *Rev. Sci. Instr.*, **28**, 828-829, 1957.
- Ritland, H. N., Relation between refractive index and density for a glass at constant temperature, *J. Am. Ceram. Soc.*, **38**, 86-88, 1955.
- Roy, R., and H. M. Cohen, Effects of high pressure on glass: A possible piezometer for the 100-kilobar region, *Nature*, **190**, 798-799, 1931.
- Stevens, J. M., The structure and physical properties of glass, in *Encyclopedia of Physics*, edited by S. Flugge, vol. 13, pp. 510-645, Springer-Verlag, Berlin, 1962.
- Tammann, G., *Der Glaszustand*, Voss, Leipzig, 1933.
- Vedam, K., E. D. Schmidt, and R. Roy, Non-linear variation of refractive index of vitreous silica with pressure to 7 kilobars, *J. Am. Ceram. Soc.*, **49**, 531-535, 1966.
- Waxler, R. M., and C. E. Weir, Effect of hydrostatic pressure on the refractive indices of some solids, *J. Res. NBS*, **69A**, 325-333, 1965.

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