

study of volume and resistivity changes associated with polymorphic transitions at high pressures. The method shows considerable promise for measurement of bulk compressibilities. Preliminary experiments indicated the possibility of performing all these measurements at high temperatures, and also showed the operation of a two-coil version for determination of magnetic permeability at high pressures.

Polymorphic transitions, which take place relatively rapidly, may be observed with high precision. No serious mechanical or electrical problems have arisen in connection with transitions. The measurement of compressibility, however, is

hindered by several difficulties, arising principally from nonhydrostatic stress and the distortion of connecting leads. Errors due to slowly-accumulated deformations can approach or even exceed the value of the compressibility. Nevertheless, the coil method has been successful in determination of compressibilities of softer substances, such as barium. It is also expected to be quantitative for hard substances after further refinement of technique.

The inductive-coil method offers a number of pronounced advantages over the more usual moving-piston volumetric apparatus and direct-current resistivity circuits.

References

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