The same characteristics of real materials which make minimizing of the enhancement easy handicap maximizing the enhancement for pressure intensification purposes. At pressures less than 10 kbar the range of available compressibilities of solids permits use of a fairly high compressibility ratio, but as is typified by the volume–pressure curve for sulfur in Fig. 6 there is a marked decrease in compressibility with increasing pressure for most initially highly compressible substances. Although this feature limits the compressibility ratios available at higher pressures, the curvature permits an initially homogeneous single-shell configuration [dotted line in Fig. 2(d)] to approximate the continuously variable shell during the experiment. At pressures greater than 50 kbar, high compressibility ratios may be obtained only if the core material has low compressibility. The dim prospect of using a core material such as diamond (Fig. 6) to contain a sample would negate the advantage of a high compressibility ratio, unless the sample was a diamond, i.e., a part of the core. Experiments of this type on very low compressibility materials, such as $SrTiO_3$, would be feasible by using a section of the core as the sample. The core material desired for most experiments would be AgCl which would severely limit the maximum compressibility ratio (see Fig. 6).

Choosing a highly compressible shell material with a low Poisson's ratio is hampered by the limited data on elastic properties of solids, especially with respect to the effects of pressure. One of the more promising shell materials appears to be KCl. Using an averaging technique described by Huntington[8] one may obtain a Poisson's ratio ($\nu=0.258$) representative of a fused mass of KCl from the single crystal elastic constants.[9] The pressure dependence of Poisson's ratio may be obtained in a like manner from the pressure dependence of the elastic constants reported by Bartels,[9] and is found to increase to only 0.28 by 10 kbar. KCl was chosen for discussion not only because it displays a fairly high compressibility in the 50 kbar region but also because KCl undergoes a pressure induced phase transition[10] with a large decrease in volume (see Fig. 6). The increase in enhancement due to the transition can be evaluated only by experiment, for although the compressibility ratio becomes extremely large during the transition, the effective elastic properties are unknown.

Over-all considerations of presently available materials lead the authors to conclude that the attainable enhancement ratio may be significant only in the region up to 10 kbar, and very limited above 30 kbar. Nevertheless, the subject is felt to warrant at least a cursory experimental verification of the enhancement in the 10-kbar region, and experimental observation of the effect of a large volume transition in the shell material.

ACKNOWLEDGMENT

The authors are indebted to Dr. M. L. Slater of the Sandia Laboratory Mathematics Research Department for several suggestions during the course of this work, and to A. L. Roark for programming the CDC 3600 to minimize I_N.

[6] H. J. McSkimin and W. L. Bond, Phys. Rev. **105**, 116 (1957).

[7] P. W. Bridgman, Proc. Am. Acad. Arts Sci. **74**, 21 (1940).

[8] H. B. Huntington, *Solid State Physics* (Academic Press Inc., New York, 1958), Vol. 7, p. 317.

[9] R. A. Bartels and D. E. Schuele, J. Phys. Chem. Solids **26**, 537 (1965).

[10] The pressure induced structure has been suggested to be the CsCl structure.[7] Alkali Halide compounds in the CsCl structure usually exhibit low Poisson ratios.