

15 March 1964

and shown in Fig. 2b. This yielded $\alpha = 75 \text{ cm}^{-1}$. Assuming then that α is directly proportional to concentration, the remaining theoretical curves, corresponding to 2.6, 5.2, and 14.2 g/l, were computed using $\alpha = 150, 300, \text{ and } 820 \text{ cm}^{-1}$, respectively. The value of σ_1 may be computed using the constants of distilled water; for $E_0 = 0.05 \text{ J/cm}^2$, 3.7 atm .

There is good agreement between the time variation and relative amplitudes of the experimental and theoretical stress profiles shown in Figs. 2 and 3. Due to a large uncertainty in the experimental value of E_0 , it is difficult to compare absolute amplitudes; however, there is at least order of magnitude agreement. Thus, these results appear to confirm that transient heating is the source of the acoustic transients observed in this study. The authors are indebted to P. E. Parks for his help in calibrating the acoustic detector.

This work was supported in part by the Office of Naval Research.

J. McClung and R. W. Hellwarth, *Proc. IEEE* 51, 1063 (1963).

M. White, *J. Appl. Phys.* 34, 2123 (1963); also private communication.

Redwood, *J. Acoust. Soc. Am.* 33, 527 (1961).

F. Carome, P. E. Parks, and S. J. Mraz, *J. Acoust. Soc. Am.* 35, 1904 (1963); and (to be published).

The amplitude of the stress impulse arising from the intensity change of the laser beam would be about 3.7 atm .

PHYSICAL RESISTANCE OF BARIUM AT ELEVATED PRESSURE AND TEMPERATURE

(phase transformations; to 67 kb;
to 800°C; E)

Experimental results on the melting and polymorphism of barium at elevated temperature and pressure were first reported in 1963, the measurements being made by differential thermal analysis.² Recent data on the electrical resistance of barium samples at pressures to 67 kilobars (kb) and temperatures to 800°C. Bridgman has published data

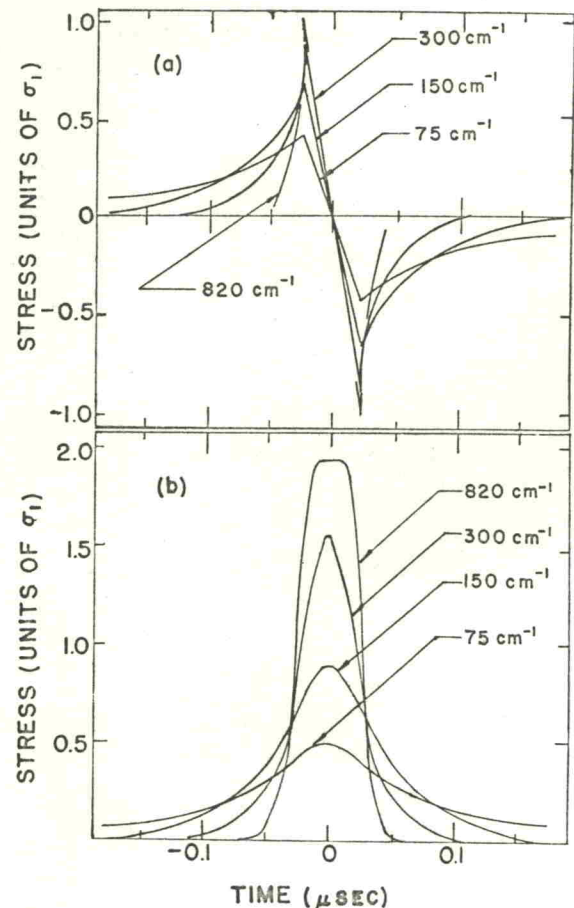


Fig. 3. Theoretical stress impulses produced by transient heating of samples having various optical absorptivities for (a) pressure-release boundary conditions, and (b) rigid boundary conditions, at the illuminated interface.

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(Received 3 February 1964)

on room-temperature resistance discontinuities in Ba at 17 and 59 kb,^{3,4} and more recently, Balchan and Drickamer⁵ found a sharp discontinuity in resistance near 144 kb. Since it has been tentatively assumed that the room-temperature transition at 144 kb corresponds to melting,^{2,6} it was felt that a study of the resistance upon melting at lower