their pressure derivatives as

$$(\partial L^*/\partial p)_T=(\partial c_{11}/\partial p)_T-(8/15)[1-(G_R/C_a)^2]$$
$$\times(\partial C_a/\partial p)_T+\tfrac{2}{5}[1+(G_R/c_{44})^2](\partial c_{44}/\partial p)_T, \quad (44a)$$

where C_a and G_R have been defined earlier in Sec. 2.

The pressure derivative of the polycrystalline shear modulus can be found by analogy to Eq. (36) as

$$(\partial G^{*s}/\partial p)_T=(\partial G^{*T}/\partial p)_T=(\partial G^*/\partial p)_T. \quad (45)$$

or in terms of the single-crystal elastic constants and their pressure derivatives as

$$(\partial G^*/\partial p)_T=\tfrac{1}{2}[\tfrac{1}{5}+\tfrac{4}{5}(G_R/C_a)^2](\partial C_a/\partial p)_T$$
$$+\tfrac{3}{10}[1+(G_R/c_{44})^2](\partial c_{44}/\partial p)_T. \quad (45a)$$

Specializing L^* to L^{*s} and K^* to K^{*s} in Eq. (44), the isothermal pressure derivative of the adiabatic longitudinal modulus is found as

$$(\partial L^{*s}/\partial p)_T=(\partial K^{*s}/\partial p)_T+\tfrac{4}{3}(\partial G^*/\partial p)_T. \quad (46)$$

These quantities $(\partial G^*/\partial p)_T$ and $(\partial L^{*s}/\partial p)_T$ given by Eqs. (45) and (46), respectively, are the useful quantities for a comparison of the single-crystal acoustic data with polycrystalline acoustic data, since the corresponding quantities can be readily determined from ultrasonic-pressure experiments with polycrystalline specimens.

When we specialize L^* to L^{*T} and K^* to K^{*T} in Eq. (44), we find that the isothermal pressure derivative of the isothermal longitudinal modulus is

$$(\partial L^{*T}/\partial p)_T=(\partial K^{*T}/\partial p)_T+\tfrac{4}{3}(\partial G^*/\partial p)_T, \quad (47)$$

where the quantity $(\partial K^{*T}/\partial p)_T$ has been specified by Eqs. (5) and (31) and the quantity $(\partial G^*/\partial p)_T$ by Eq. (45a).

By analogy to Eqs. (40) and (42), we obtain the adiabatic pressure derivatives of the adiabatic longitudinal and shear moduli as

$$(\partial L^{*s}/\partial p)_s=C(\partial L^{*s}/\partial T)_p+(\partial L^{*s}/\partial p)_T, \quad (48)$$

and

$$(\partial G^{*s}/\partial p)_s=C(\partial G^{*s}/\partial T)_p+(\partial G^{*s}/\partial p)_T, \quad (49)$$

respectively. The parameter C has been given earlier by Eq. (38), and the quantities $(\partial L^{*s}/\partial T)_p$ and $(\partial G^*/\partial T)_p$ can be found from experimental data on the temperature variation of $c_{\mu\nu}{}^s$.

It is important to note that, although the isothermal pressure derivative of the adiabatic shear modulus is exactly the same as that of the isothermal shear modulus, the adiabatic pressure derivative of the adiabatic shear modulus is quite different from the isothermal pressure derivative of the adiabatic shear modulus.

The calculated values of the single-crystal acoustic data corresponding to (a) isothermal pressure derivatives of the isothermal elastic constants and (b) adiabatic pressure derivatives of the adiabatic elastic

TABLE V. Elastic and thermoelastic data for crystalline Al, Cu, α-Fe, and MgO.

Material	Density (g/cm^3)	$c_{11}{}^s$	$c_{12}{}^s$	c_{44}	$C_a{}^s$	K^s	$-(\partial c_{11}{}^s/\partial T)_p$	$-(\partial c_{12}{}^s/\partial T)_p$	$-(\partial c_{44}/\partial T)_p$	Reference temperature (°K)
		($\times10^{-11}$ dyn/cm²)					($\times10^7$ dyn/cm²·°K)			
Al(49L1)[a]	2.699	10.56	6.39	2.853	4.17	7.78	46.1[b]	27.2	12.9	298
Al(59S1)	2.697	10.73	6.09	2.83	4.64	7.64	46.1[b]	27.2	12.9	300
Cu(49L1)	8.941	17.10	12.39	7.56	4.71	13.96	40.3[c]	18.2	25.6	298
Cu(58D1)	8.932	16.81	12.14	7.51	4.67	13.70	40.3[c]	18.2	25.6	300
Cu(66H1)	8.932	16.61	11.99	7.56	4.62	13.53	40.3[c]	18.2	25.6	298
α-Fe(66R1)	7.872	23.14	13.46	11.64	9.68	16.69	39.3[d]	20.2	9.3	300
MgO(65B1)	3.581	29.71	9.54	15.61	20.17	16.26	58.8[e]	−6.3	12.5	300

[a] This reference refers to the author whose acoustic data have been cited in Table I.
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