where C^S is the adiabatic elastic constant C_{11}, C_{44}, or C'. C_o^S, B_o^T, $B_o^{T'}$ are the adiabatic elastic constant, isothermal bulk modulus, and the first pressure derivative of isothermal bulk modulus at zero pressure, respectively. Also, a_1 and a_2 are the first and second order pressure coefficients listed in Table V in Martinson's paper.[4]

We have chosen the data at 195°K because they were taken over a wider pressure range up to 9 Kbars which would give a better estimate of the first and second pressure derivatives of the bulk modulus. The fact that Martinson assumed linearity of the pressure versus resistance change of the manganin gauge led to some minor errors in the estimation of the first and second pressure derivatives of the bulk modulus. The nonlinearity of the manganin gauge has been discussed in the literature.[5] We have now corrected for this effect by fitting his actual gauge with a quadratic pressure scale.

Ho and Ruoff[6] had also analysed Martinson's data using Cook's[7] analysis. In the present paper, we use Overton's[8] relation to calculate the first pressure derivative of isothermal bulk modulus at 195°K and zero pressure from that of the adiabatic bulk modulus. We also further generalize Overton's relation to the second pressure derivative as follows:

$$\left(\frac{\partial^2 B^T}{\partial P^2}\right)_T = \left(\frac{\partial^2 B^S}{\partial P^2}\right)_T + \Delta' \left[1 - \frac{2}{\beta B^T}\left(\frac{\partial B^T}{\partial T}\right)_P - 2\left(\frac{\partial B^S}{\partial P}\right)_T \right]$$

$$+ \Delta \left[\frac{2}{\beta^2 B^{T^3}}\left(\frac{\partial B^T}{\partial T}\right)_P^2 + \frac{2}{\beta B^{T^2}}\left(\frac{\partial B^T}{\partial P}\right)_T\left(\frac{\partial B^T}{\partial T}\right)_P - \frac{2}{\beta B^T}\frac{\partial}{\partial T}\left(\frac{\partial B^T}{\partial P}\right) - 2\left(\frac{\partial^2 B^S}{\partial P^2}\right)_T \right]$$