contact with the liquid samples. This particular aluminum alloy was chosen because the Hugoniot curve has been measured more extensively than any other solid.[26] The procedure is to measure the shock velocity in the aluminum standard and in the liquid samples. Then the state P_1, U_{p1} for the 2024 dural is identified from the intersection of the line of slope $\rho_0 U_{s1}$ with its Hugoniot curve. The release isentrope which is calculated from this measured state is constructed and the intersection point of this curve with the ray of slope $\rho'_0 U_{s2}$ yields the compressed state P_2, U_{p2} for the sample. This method was used to determine the Hugoniot curves for the liquids studied here.

F. Thermodynamics of the Shocked State

Through the Hugoniot relation and the conservation of mass and momentum, the measured quantities U_s, U_p, and ρ_0 are connected with changes in internal energy in terms of the mechanical variables P and V. It is then possible to calculate the temperature and the local sound speed on the Hugoniot and, with the aid of simple assumptions, to determine isentropes and isotherms off the Hugoniot.

These calculations are based on the Mie-Gruneisen equation of state[21, 27] for solids and is written in the form

$$\Gamma / V = (P - P_0) / (E - E_0) \qquad (24)$$

where V is the volume, P is the pressure, E is the energy, and Γ is the Gruneisen ratio and assumed to be a function only of volume. The zero subscript refers to a reference state.

The Gruneisen ratio can be written in terms of other thermodynamic quantities. By differentiating Eq. (24) with respect