ABSTRACT

Shock waves generated by high explosives were used to obtain Hugoniot data for benzene, carbon disulfide, and carbon tetrachloride initially at 300°K and liquid nitrogen initially at 75°K. Electrical pin contactors were used to determine the shock velocity in a dural standard plate and in the liquids. From these data and the known dural equation of state, the Hugoniot curves for the liquids were determined by means of the conservation relations and continuity conditions. Dynamic pressures achieved ranged from 20 to 600 kbar in the samples. A plot of the shock velocity (U_s) versus particle velocity (U_p) data for benzene reveals three regions each of which is described by a linear relationship. This is indicative of a transition occurring at 125 kbar and ending at 180 kbar. The carbon disulfide U_s-U_p plot reveals a lower region fitted by a straight line, a middle region of constant shock velocity, and a upper region fitted by another straight line. The middle portion corresponds to 64 kbar and the liquid is believed to transform at this pressure to the so-called black form of carbon disulfide. Two straight lines with differing slopes describe the U_s-U_p data of carbon tetrachloride. This may be the result of crossing a fusion line. The liquid nitrogen U_s-U_p plot is interpreted to have four possible regions and are (1) a lower portion fitting a straight line, (2) a region of constant shock velocity, (3) a region which fits a straight line of steep slope, and (4) the highest region fitting another straight line.