

Abstract Submitted  
for the SHOCK19 Meeting of  
The American Physical Society

**Refractive index measurements of atomic, molecular and mixed gases at high pressures up to 60 MPa** CHENGJUN LI, QIFENG CHEN, YUNJUN GU, LEI LIU, GUOJUN LI, ZHIGUO LI, China Academy of Engineering Physics — The refractive index of initially transparent gases at high pressures is very important for shock velocity measurements in shock compression experiment since the measured shock velocity has to be modified by the refractivity of the initial sample. In this work, by using optical frequency domain interferometer (OFDI), we measured the refractive index of atomic (He, Ne, Ar, Kr, Xe), molecular ( $H_2$ ,  $D_2$ ,  $O_2$ ,  $N_2$ ) and mixed gases ( $H_2+D_2$ ,  $H_2+Ar$ ,  $D_2+He$ ) up to 60 MPa. The polarizability of different gases were derived from their refractive index according to Lorentz-Lorenz formula. The measured equation of state (P-V-T) are also compared with the predictions of Self-consistent Fluid Variation Theory (SFVT) and other gaseous equation of state under the pressures interested. The mixing rule below 60 MPa were verified by the experimental results of mixed gases investigated in this work.

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Date submitted: 23 Feb 2019

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