Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

Interferometric windows characterization up to 450 K for shock wave experiments: Hugoniot curves and refractive index E. FRAIZIER, P. ANTOINE, J.L. GODEFROIT, G. LANIER, G. ROY, CEA Valduc — Conventional shock wave experiments need interferometric windows in order to determine the equation of state of a large variety of metals. Lithium fluoride (LiF) and sapphire are extensively used for that purpose because their optical transparencies enable the optical diagnostics at interfaces under a given range of shock pressure. In order to simulate and analyse the experiments it is necessary to gather a correct knowledge of the optical and mechanical properties of these windows. Therefore, our window supplies are systematically characterized and an experimental campaign under shock loading is conducted. Our preliminary work on LiF windows at 532 nm is in good agreement with literature data at room temperature and the new characterization at 450 K enables a better interpretation of our preheated target experiments and confirms the predominant effect of density on optical properties under pressure and temperature. The present work demonstrates that the initial density determination is a key point and that the uncertainties need to be improved. For that purpose, complementary experiments are conducted on LiF windows with simplified target designs and enriched diagnostics, coupling VISAR (532 nm) and PdV (1550 nm) diagnostics. In the future, a similar campaign will be conducted on sapphire windows.

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Date submitted: 22 Feb 2011 Electronic form version 1.4