

Mechanical and Permeation Properties of Thin GDP Shells Used as Cryogenic Direct Drive Targets at OMEGA*

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Thin glow discharge polymer (GDP) shells are currently used as the targets for cryogenic direct drive laser fusion experiments. These shells need to be filled with nearly 1000 atmosphere of D_2 and cooled to cryogenic temperatures without failing due to buckling and bursting pressures they experience in this process. Therefore, the mechanical and permeation properties of these shells are of utmost importance in successful and more rapid filling with D_2 . In this paper, we present an overview of buckle and burst pressures of several different types of GDP shells. These include those made using traditional GDP deposition parameters (“normal GDP”) and using modified parameters (“strong GDP”) leading to more robust shells. We also present data on deuterium permeation time constants of thin shells using a mass spectrometer.

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