DEVELOPMENT OF FOAM TARGETS USED IN INERTIAL FUSION EXPERIMENTS*

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This paper reviews the processes developed at General Atomics in the past several years to fabricate a variety of foam targets at various densities for the ICF community. The two most common chemical systems used to produce foam targets have been resorcinol-formaldehyde (R/F) aerogel and divinylbenzene (DVB). We have produced batch quantities of foam targets in spherical, cylindrical, and planar geometries. Spherical targets have been made in the form of shells and beads with diameters ranging from approximately 0.5 mm to 4.0 mm, and densities from 100 mg/cc to 250 mg/cc, with typical yield of intact shells or beads of 90%–95%. Permeation barriers have been developed and deposited on both R/F and DVB shells. We have also made R/F foam shells with higher pore size (0.10–0.50 μm) in order to increase the cryo-fill fraction when these shells are cryogenically layered with D_2. Another spherical target that is currently under development that will also be discussed is silica aerogels shells and beads. Novel planar full density CH coated foam targets with sinusoidal perturbations have been made for Rayleigh-Taylor experiments using laser machining. Foams have also been cast directly into CH shock tubes . Other foam target materials currently under development, such as metallic oxide aerogels and metal doped aerogels (EUV) will also be discussed.

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