Abstract Submitted for the DPP09 Meeting of The American Physical Society

Surface Roughness Reduction on Divinylbenzene Foam Shells¹ JON STREIT, JOHN KARNES, BRIAN MOTTA, NICOLE PETTA, Schafer Corporation — Inertial fusion energy targets for the Naval Research Laboratory's High Average Power Laser Program require millimeter-scale, low density foam capsules with a gas permeation barrier and an outer surface roughness less than 50 nm RMS. Divinylbenzene (DVB) foam is a candidate for the capsule wall material, but its porous, open celled surface has been both too rough and difficult to seal. To overcome this difficulty we have repurposed a previously reported dual stage initiator emulsion microencapsulation method, adding an additional step that enhances the surface of the foam capsules. Using both low and high temperature initiators allows the DVB foam to gel in the low temperature stage and a water soluble monomer to be added and polymerized during the high temperature stage without breaking down the emulsion. This method forms a submicron skin that covers the open celled DVB foam surface, resulting in a superior substrate for gas permeation barrier deposition.

¹This work was performed under the auspices of the U.S. Department of Energy by Schafer Corporation under contract numbers DE-AC52-06NA27472 and N00173-06-C-6010.

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Date submitted: 16 Jul 2009

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