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Demonstration of Mass Production Layering of Inertial Fusion Energy Targets using a Room Temperature Surrogate for DT[1] B.J. BARCUS, Rensselaer Polytechnic Institute, N.B. ALEXANDER, D.T. GOODIN, L.C. BROWN, G.E. BESENBRUCH, General Atomics — An inertial fusion energy reactor requires the mass production of targets. The process includes filling the targets with DT and re-distributing the DT at cryogenic temperatures into a uniform layer inside of the spherical target capsules. Proof-of-principle, mass production layering experiments were conducted at room temperature using capsules filled with a surrogate, neopentyl alcohol, for DT. The self-heating of DT by beta-decay of the tritium is simulated with infrared light. The self-heating produces a preferential sublimation-condensation effect from the thick (warmer) regions of DT or alcohol to the thin (colder) regions of DT or alcohol. This creates a layer of uniform thickness when capsules are placed in an environment that uniformly removes heat from the capsule surface. A fluidized bed, which can handle a vast number of targets at once, was investigated for producing the required thermal environment for capsule layering. Capsules were filled with neopentyl alcohol by diffusion and by injection through a needle.

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