

Abstract Submitted
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High-Density Carbon (HDC) Ablator for NIC Ignition Capsules¹

D. HO, S. HAAN, J. SALMONSON, J. MILOVICH, D. CALLAHAN, Lawrence Livermore National Lab — HDC ablaters show high performance based on simulations, despite the fact that the shorter pulses for HDC capsules result in higher M-band radiation compared to that for plastic capsules. HDC capsules have good 1-D performance because HDC has relatively high density (3.5 g/cc), which results in a thinner ablator that absorbs more radiation. HDC ablaters have good 2-D performance because the ablator surface is more than an order-of-magnitude smoother than Be or plastic ablaters. Refreeze of the ablator near the fuel region can be avoided by appropriate dopant placement. Here we present two HDC ignition designs doped with W and Si. For the design with maximum W concentration of 1.0 at% (and respectively with maximum Si concentration of 2.0 at%): peak velocity = 0.395 (0.397) mm/ns, mass weighted fuel entropy = 0.463 (0.469) kJ/mg/eV, peak core hydrodynamic stagnation pressure = 690 (780) Gbar, and yield = 17.3 (20.2) MJ. 2-D simulations show that yield is close to 80% YoC even with 2.5x of nominal surface roughness on all surfaces. The clean fuel fraction is about 75% at peak velocity. Doping HDC with the required concentration of W and Si is in progress. A first undoped HDC Symcap is scheduled to be fielded later this year.

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