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Suppression of RTI by the use of high-Z doping scheme on mega-joule scale implosion[1] TAKASHI SHIROTO, NAOFUMI OHNISHI, Department of Aerospace Engineering, Tohoku University, ATSUSHI SUNAHARA, Institute for Laser Technology, SHINSUKE FUJIOKA, Institute of Laser Engineering, Osaka University, AKIRA SASAKI, Kansai Photon Science Institute, National Institute for Quantum and Radiological Science and Technology — RayleighTaylor Instability (RTI) is one of the most critical issue to prevent thermonuclear ignition of Inertial Confinement Fusion (ICF). High-Z doping scheme (S. Fujioka et al., Phys. Rev. Lett. 92, 195001, 2004) seems to be a candidate for suppression of the RTI, but there is a report that pure mid-Z ablators have no capability to improve the implosion symmetry for ignition-scale target designs (M. Lafon et al., Phys. Plasmas 22, 032703, 2015). We used 0.05%-doped brominated polystyrene (CHBr) for the rad-hydro numerical experiment, whose opacity tables were validated by a planar target experiment. It was numerically demonstrated that perturbation growth was suppressed at relatively high mode even in the ignition-relevant scale. The ablative-RTI was NOT suppressed at the main-drive phase when the pulse intensity became the maximum as mentioned in the Lafons past work. However, the high-Z doping scheme was valid at the foot-drive phase when the intensity was $\leq 10^{14}$ W/cm^2, which is consistent with the Fujiokas experiment. Resultant areal density with the CHBr ablator was twice as high as the pure plastic one. This fact implies the significance of hydrodynamic instabilities at relatively-low acceleration, such as the foot pulse of Kidder-like implosion.

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