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Experimental Evidence for Reduced Stimulated Brillouin Backscatter in hohlraums when using a Ta2O5 liner.[1] JOSEPH RALPH, PIERRE MICHEL, ANDREAS KEMP, BRIAN MACGOWAN, NUNO LEMOS, NATHAN MEEZAN, RICHARD BERGER, RICHARD BERGER, TOM CHAPMAN, MIKHAIL BELYAEV, LAUREN DIVOL, OGGIE JONES, Lawrence Livermore Natl Lab — High levels of Stimulated Brillouin Backscatter (SBS) from experiments on the National Ignition Facility remain a significant damage risk for optics. Light from SBS near the 351 nm laser wavelength can propagate backward through the final optics assembly and result in damage. As a result, new experiments on the NIF must ramp up in power and energy over several shots slowing the development of new designs. Mitigation of SBS may be achieved by designing targets with materials that damp the growth of ion acoustic waves. Theory and simulations show that the light oxygen species, in Ta2O5, damps the Ta and/or Au ion acoustic waves effectively, resulting in decreased backscatter. We performed a series of four experiments in which the interior of a gold hohlraum was lined with a 1.1 micron Ta2O5 liner or left unlined and measured the effect on SBS, implosion symmetry, hohlraum hydrodynamics, and hohlraum performance. Measurements show that lining the gold hohlraum interior with Ta2O5 reduces the SBS by 5x in the outer 50 deg. beamlines. Images of the wall bubble show that the Ta2O5 liner expands roughly 10% faster resulting in a more oblate implosion. Legendre mode P2/P0 decreases from -29% to -49% when using the liner. Experimental results will be presented and compared with simulations.

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