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Changes in Concentrations of Plasma ION-Components In Hotspot Driven By Thermodynamic Forces and their Effects on Implosions[1] D. HO, G. ZIMMERMAN, LLNL, G. KAGAN, LANL, P. AMENDT, H. RINDERKNECHT, S. HAAN, J. PERKINS, J. SALMONSON, LLNL — Changes in relative concentrations of plasma ion components driven by gradients of mass concentration, pressure, and temperature gradients, occur during shock flash and subsequent hotspot formation. This is a universal phenomenon in all laboratory implosions with two-ion component fuels, e.g., DT and D^3He, occurring in the central region of the hotspot. Concentration differentials lead to noticeable yield reduction in Omega exploding pusher implosions, but not in NIF "Symcaps" where radiation-hydrodynamics simulations are in agreement with shot data. For all our ignition capsules designs that use a high-density carbon ablator and DT fuel adiabat α ranging from 1.5 to 4, substantial concentration differentials occur around shock flash but they are relaxed by the time of ignition resulting in no simulated yield degradation. We will provide explanations and present simulation results for this phenomenon.

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Darwin Ho
LLNL

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