Modeling reactive conversion of Ce ejecta in H$_2$ and D$_2$ gases$^1$ J.D. SCHWARZKOPF, D.G. SHEPPARD, J.E. HAMMERBERG, M.M. SCHAUER, W.T. BUTTLER, R.K. SCHULZE, Los Alamos National Laboratory — Shocked Ce metal in contact with a reactive gas such as H$_2$ or D$_2$ produces a distribution of ejecta particles that react with the gas to form Ce hydrides or deuterides. We present an average particle reaction diffusion model to calculate particle and gas temperatures and reaction fractions. We compare model results with recent HE driven Ce experiments into reactive D$_2$ and non-reactive He gases for a variety of initial gas pressures from 2 to 8 atmospheres at initial temperatures of 300 K. We find consistent agreement with radiance temperature measurements as a function of time using particle distributions from Mie scattering data resulting in Ce deuteride mass conversion fractions in D$_2$ gas of order 10 - 15%.

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