Liquid Carbon reflectivity in the MB regime

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We present the recent results of an experiment aimed at measuring of reflectivity of carbon in thermodynamical states lying outside the standard graphite or diamond Hugoniot. The final state reached in compression can be varied tuning the carbon layer characteristics (initial density and thickness) and the laser intensity, with the possibility to determine the reflectivity of carbon and the position on the phase diagram. Experiments were realized with the GEKKO/HIPER system at the Institute of Laser Engineering (ILE), Osaka University. Numerical simulations using the code MULTI (multigroup radiation transport in multilayer foils) to optimize target parameters and to clarify shock dynamics were applied. The limits of the carbon-on-transparent substrate design have been explored, the whole experimental scheme proof has been obtained, and finally the increase of reflectivity in carbon was observed at pressure of 2.6 MB and temperature of 1.2 eV while no increase in reflectivity is found at 2.0 MB and 1.7 eV.

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