

Abstract Submitted
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Microstructural investigation of melting in laser-shocked recovered iron foils GUILLAUME MORARD, FRANCOIS GUYOT, GUILLAUME FIQUET, IMPMC, Paris, France, ALESSANDRA BENUZZI-MOUNAIX, ERIK BRAMBRINK, MICHEL KOENIG, HUIGANG WEI, ALEXANDRA DIZIERE, LULI, Ecole Polytechnique, Palaiseau, France, THIBAUT DE RESSEGUIER, EMILIEN LESCOUTE, LCD, ENSMA, Poitiers, France, FLORENT OCCELLI, TOMMASO VINCI, CEA, DAM, DIF, Arpajon, France — For a better characterization of the melting of shocked iron, we have carried out a study that combines a visual observation of recovered samples in the micrometer range along with in-situ time-resolved diagnostics. High-power laser shots were carried out at LULI 2000, France on 100 μm foils. A velocity interferometer system (VISAR) was used to measure the free surface velocity. Hydrodynamic simulations were performed. Then, the pressure and the temperature in solid iron were reconstructed through the iron foil using the Rankine-Hugoniot relations. These data were compared with Scanning Electron Microscope (SEM) analysis of recovered targets and ejecta that were collected on transparent polycarbonate plates placed on the opposite face. The evolution of the molten part of the target in relation with the analysis of the different categories of recovered ejecta gives useful indications on the potential of laser shock techniques for studying the melting of iron under planetary core conditions.

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