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Design and Fabrication of RF/CRF Aerogel Flier-Plates with Graded Density For Laser-Driven Quasi-Isentropic Compression Experiments YANG SHEN, Tongji University, Shanghai Key Laboratory of Special Artificial Microstructure Materials and Technology, Northwestern University, BIN ZHOU, AI DU, Tongji University, Shanghai Key Laboratory of Special Artificial Microstructure Materials and Technology, XIUGUANG HUANG, Shanghai Institute of Laser Plasma, WILLIAM HALPERIN, Northwestern University — Resorcinol Formaldehyde (RF)/Carbonized Resorcinol Formaldehyde (CRF) aerogel flier-plates with graded density were designed and fabricated via simple and effective approaches, for increasing the peak pressure and shaping the compression profile in Laser-driven quasi-isentropic compression (ICE) experiments. Sol-gel technique and flexible micro-mould were involved in launching density gradients into aerogel. Resorcinol (R)-formaldehyde (F)-water system catalyzed by sodium carbonate (C) was employed to provide organic RF aerogel, various of sol with different recipes were cast into the mould layer by layer; A carbon dioxide (CO_2) supercritical fluid drying (SCFD) process and a four-step pyrolysis process were applied to convert RF hydrogel into RF aerogel, RF aerogel into CRF aerogel, respectively. After a four-step pyrolysis process, RF aerogel was converted to CRF aerogel. The strategies were demonstrated to be simple and effective in launching density gradients into RF/CRF aerogel flyer-plates. It was found in the Laser-Driven Quasi-Isentropic compression experiments of Al that the rise time of the ramp compression wave was about 50% longer for the graded density RF aerogel case.

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