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X-ray diffraction study of ramp-compressed Fe and MgO[1] FEDERICA COPPARI, RAYMOND SMITH, JON EGGERT, RYAN RYGG, AMY LAZICKI, JAMES HAWRELIAK, DAMIEN HICKS, Lawrence Livermore National Laboratory, JUE WANG, THOMAS DUFFY, Princeton University, GILBERT COLLINS, Lawrence Livermore National Laboratory — The study of Fe and MgO under extreme conditions of pressure and temperature is of great relevance for a variety of fields ranging from basic science and high-pressure condensed matter to geophysics and planetary science. We used laser-driven ramp-compression to achieve 5 and 9 Mbar in Fe and MgO respectively and the structural evolution and transformations were documented by in-situ x-ray diffraction. Velocity interferometry was used to infer the pressure. We found that the hexagonal close-packed (hcp) structure of iron remains stable up to 5 Mbar with no significant change in the c/a ratio. A new phase of MgO was observed above 6 Mbar and it is consistent with the CsCl (B2) structure. The new polymorph remains stable up to 9 Mbar, the highest pressure reached in our experiments.

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