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Crystal Structure of Ramp-Compressed Silicon up to 550 GPa XUCHEN GONG, DANAE POLSIN, REETAM PAUL, RAHUL SAHA, RYAN RYGG, GILBERT COLLINS, Laboratory for Laser Energetics — A doublehexagonal close-packed (dhcp) phase of silicon has been recently predicted theoretically at pressures between 40 and 80 GPa. In this work, Si was ramp compressed by the OMEGA EP laser along a quasi-isentropic thermodynamic path and studied using x-ray diffraction and velocimetry. The observed diffraction pattern matches that of the dhcp phase at the predicted pressure range. Moreover, this work also studied the crystal structure of silicon at pressures up to 550 GPa; and no new phases were observed. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856, the University of Rochester, and the New York State Energy Research and Development Authority.

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