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Phase Diagram of Sn into the Megabar Pressure Range RICHARD BRIGGS, The University of Edinburgh, ASHKAN SALAMAT, Harvard University, DOMINIK DAISENBERGER, Diamond Light Source, PIERRE BOUVIER, CNRS, SYLVAIN PETITGIRARD, GASTON GARBARINO, European Synchrotron Radiation Facility, AGNES DEWAELE, CEA, PAUL MCMILLAN, University College London — The melting curve of Sn has previously been studied using shock techniques up to P ~50 GPa, and recent diamond anvil cell experiments showed flat melting temperatures between 40 and 68 GPa. We performed new melting experiments using laser-heated diamond anvil cell techniques combined with *in situ* synchrotron X-ray diffraction, revealing a steep rise in melting slope above 70 GPa up to a maximum $T_m \sim 5500 \pm 500$ K at 1.05 Mbar. Those results immediately paved the way for laser driven shock experiments that could probe both the melting relation following shock compression and the solidus below the melting curve in the 1-10 Mbar pressure range via ramp compression and diffraction techniques. We also performed room temperature experiments to 1.4 Mbar using the diamond anvil cell with near hydrostatic conditions (He loadings) and synchrotron X-ray diffraction. Our results at room temperature reveal a previously unreported distortion of the body centered tetragonal phase (*I4/mmm*) to an orthorhombic structure (*Immm*) at 32 GPa. Between 40 and 70 GPa, the X-ray diffraction patterns reveal two structures that can be assigned to this body centered orthorhombic structure and the second to the previously reported bcc (*Im-3m*) phase. The phase diagram spreading across 2 Mbar and 6000 K will be discussed.

Richard Briggs
The University of Edinburgh

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