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Diffuse X-ray Scattering from Shock Recovered Metals* R.I. BARABASH, G.E. ICE, W. LIU, Metals and Ceramics Division, Oak Ridge National Laboratory, Oak Ridge, TN, J. BELAK, G.H. CAMPBELL, M. KUMAR, H.E. LORENZANA, University of California, Lawrence Livermore National Laboratory, Livermore, CA, J.S. WARK, Department of Physics, Clarendon Laboratory, University of Oxford, Oxford, UK — A detailed understanding of plasticity during shock loading has been inhibited by the need to examine soft recovered samples. Diffuse X-ray scattering offers the prospect of quantifying the plastic state in situ during shock loading. The disorder created at the shock front leads to significant diffuse scattering surrounding the Bragg peaks. Analysis of this diffuse scattering results in a measure of dislocation density and local lattice rotation. Prior to fielding the in situ experiment at synchrotron light sources, we have measured polychromatic X-ray microdiffraction from shock recovered samples of Al and Cu at the Advanced Photon Source. The density and organization of dislocations will be presented as well as comparison to TEM. ∗Use of the Advanced Photon Source was supported by the U. S. Department of Energy, Office of Science, Office of Basic Energy Sciences, under Contract No. W-31-109-Eng-38 and work sponsored by the Metals & Ceramics Division through the ORNL operated by UT-Battelle LLC for the U.S. Department of Energy under contract DE-AC05-00OR22725 and performed under the auspices of the U.S. Department of Energy by University of California, LLNL under Contract W-7405-Eng-48.

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