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Crystal Orientation Imaging of Nanometric Metal Films in the Transmission Electron Microscope A. DARBAL, K. BARMAK, N. T. NUHFER, Dept. of Mater. Sci. and Eng., Carnegie Mellon Univ., Pittsburgh, PA 15213, D. J. DINGLEY, G. MEADEN, EBSD Consultants, Salt Lake City, UT 84105, J. MICHAEL, Sandia National Laboratories, Albuquerque, NM 87185, T. SUN, B. YAO, K. R. COFFEY, AMPAC, Univ. of Central Florida, Orlando FL 32816 — A reliable method for orientation mapping of nanocrystals is crucial to the study of the impact of grain boundaries on resistivity increase of metal films as thickness is reduced (classical size effect). Here we report on the use of the Automated Crystallography (ACT) system for high-resolution grain and orientation mapping in the TEM. The samples for the study were a 50 nm-thick Pt film annealed at 800 $^\circ$C and a 40 nm-thick Cu film annealed at 450 $^\circ$C. In ACT, the diffraction pattern for a given point is constructed by analyzing its intensity variation in a series of dark field images obtained using hollow-cone illumination. The reconstructed diffraction pattern for every point is indexed to obtain the orientation map. The sensitivity of the orientation imaging results to details of sample preparation, data acquisition and choice of indexing parameters is discussed.

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