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Study of slip bands formation in single crystal aluminum during uniaxial deformation using laser-induced photoemission technique MINGDONG CAI, Physics Department, Washington State University, Pullman. WA 99164, LYLE E. LEVINE, DAVID J. PITCHURE, National Institute of Standards and Technology, 100 Bureau Dr., Gaithersburg, MD 20899-8553, J. T. DICKINSON, Physics Department, Washington State University, Pullman. WA 99164 — We report the application of the photostimulated electron emission (PSE) technique to study the slip bands formation from single crystal aluminum (99.995%) during uniaxial tensile deformation. A 248-nm excimer laser (5-eV photon energy) was used as light source and the deformation was conducted with a tensile stage in ultra high vacuum working at strain rate ranging from 1×10^{-3} to 1×10^{-4} s^{-1}. We show that photoelectron intensities are sensitive to changes in surface morphology accompanying deformation, including slip line and band formation. In all single crystal aluminum deformed at different strain rate, the PSE intensity increases linearly with strain. Time-resolved PSE measurements show step-like increases in intensity consistent with the heterogeneous nucleation and growth of slip bands during tensile deformation. The *in situ* PSE data strongly supports a recently developed dislocation dynamics model based on a percolation process. Real-time stress versus strain curves further support this model. Characterization of slip bands on the deformed surfaces was examined by atomic force microscopy (AFM).

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