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Surface Analysis of Hexagonal Boron Nitride Grown by Chemical Vapor Deposition ZACHARY ROBINSON, State Univ of NY - Brockport, J.K. HITE, C.R. EDDY JR., V.M. BERMUDEZ, B.N. FEIGELSON, U.S. Naval Research Laboratory — Hexagonal boron nitride (hBN) is an important material for development of 2-dimensional heterostructures. Chemical vapor deposition of hBN on Cu-foil substrates is one possible route towards large-scale production of hBN films with low defect density. Therefore, studying the growth kinetics of hBN on different orientations of Cu is an important first step towards understanding and controlling the growth process. In this work, hBN was simultaneously grown on Cu(111), Cu(100), Cu(110), and Cu-foil in order to investigate how the different substrate orientations affect the hBN overlayer. The post-growth crystallographic orientations were measured with electron backscatter diffraction (EBSD), and film coverages we measured with XPS. In addition, a grazing-incidence infrared reflection absorption spectroscopy (IRRAS) technique was developed to quickly characterize each hBN film. It was found that the growth rate was inversely proportional to the surface free energy of the Cu surface, with Cu(111) having the most h-BN surface coverage. The Cu foil predominately crystallized with a (100) surface orientation, and had a film coverage very close to the Cu(100).

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