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The Surface Dynamics of the Initial Oxidation Behavior of CuNi Alloys STEVE ZIEMACK, LI SUN, JUDITH YANG, JEFF EASTMAN, GUANGWEN ZHOU, UNIVERSITY OF PITTSBURGH COLLABORATION, ARGON NATIONAL LABORATORY COLLABORATION, BINGHAMTON UNIVERSITY COLLABORATION — As an extension of our previous work on the initial oxidation stages of pure Cu and CuAu alloy, we are currently visualizing the oxidation of CuNi alloys by in-situ ultra high vacuum transmission electron microscope (UHV-TEM) and X-ray diffraction. We investigated systematically a range of CuNi (001) compositions, including 2,8,15 and 24 at%Ni at P (O2) =5x10-4 torr and T=500-700°C. The initial oxidation behavior is similar to that of Cu (001) AND CuAu (001), where oxide islands rapidly nucleate, grow and coalesce. However, remarkable differences exist: 1) a second rapid nucleation of compact and dense oxide islands occurred and 2) polycrystalline oxides formed, where only cube-on-cube epitaxial Cu2O islands nucleated on Cu (001) and CuAu (001) for all temperature and pressures studied. The surface segregation behavior of Cu and Ni may explain these surprising results.

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