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LEEM study of nucleation, growth, and decay of Ag nanowires on Cu(110) INDRAJITH SENEVIRATHNE, Louisiana State University, EZRA BUSSMANN, GARY KELLOGG, Sandia National Laboratory, RICHARD KURTZ, PHILLIP SPRUNGER, Louisiana State University — Low energy electron microscopy (LEEM) has been used to study the nucleation, growth, and ripening of Ag nanowires on Cu(110). Previous STM and LEED studies of Ag on the Cu(110) surface have shown that for a Ag coverage of below 0.3 ML, Ag forms a surface alloy, followed by the formation of a 2D Ag(111) flat superstructure through dealloying at one monolayer. For Ag coverages above 1.3 ML , nanowires of Ag(110), with widths/heights of 12 nm / 2nm, grow along the [1$\underline{1}$0] crystallographic direction with highly anisotropic aspect ratios. LEEM reveals that Ag initially alloys at Cu/Ag step edges producing a distortion of the steps. Upon deposition above 1 ML, nucleation of Ag nanowires was observed across terraces, however nucleation still occurred at defect and step edges. LEEM showed that the nanowires grow to micron lengths and have highly anisotropic aspect ratios. Annealing above 573K resulted in rapid Oswald ripening of nanowires to Ag clusters of several micron dimensions. Quantitative details of the growth and decay mechanisms will be discussed. Sandia Corporation is a Lockheed Martin Company, for the US DOE's NNSA under Contract DE-AC04-94AL85000. Work was supported CINT-U2006A123 and NSF-DMR-0504654.

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