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Dealloying NiCo and NiCoCu Alloy Thin Films Using Linear Sweep Voltammetry¹ BENJAMIN PEECHER, JENNIFER HAMPTON, Hope College — When electrodeposited into thin films, metals have well-known electrochemical potentials at which they will be removed from the film. These potential differences can be utilized to re-oxidize only certain metals in an alloy, altering the films structure and composition. Here we discuss NiCo and NiCoCu thin films response to linear sweep voltammetry (LSV) as a means of electrochemical dealloying. For each of four different metal ratios, films were dealloyed to various potentials in order to gain insight into the evolution of the film over the course of the LSV. Capacitance, topography, and composition were examined for each sample before and after linear sweep voltammetry was performed. For NiCo films with high percentages of Ni, dealloying resulted in almost no change in composition, but did result in an increased capacitance, with greater increases occurring at higher LSV potentials. Dealloying also resulted in the appearance of large (100–1000 nm) pores on the surface of the film. For NiCoCu films with high percentages of Ni, Cu was almost completely removed from the film at LSV potentials greater than 500 mV. The LSV first removed larger copper-rich dendrites from the films surface before creating numerous nano-pores, resulting in a net increase in area.

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