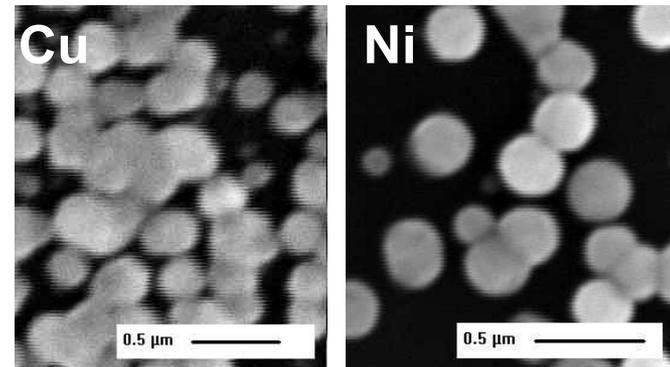


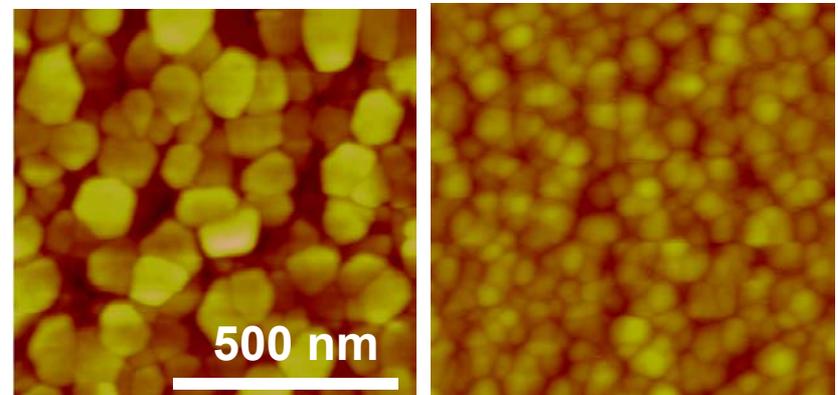
Fundamental Aspects of Electrocristallization: an Experimental and Modeling Approach

Giovanni Zangari, University of Virginia – DMR-0093154

A fundamental understanding of metal growth from electrolytic solutions enables close control of microstructure and properties of thin films, essential for the synthesis of high performance films, nanostructures, and patterns. In this project, coupled experimental and modeling efforts are used to understand the growth processes of selected metals and to construct predictive models for the effect of deposition variables on microstructure, essential for the successful miniaturization and improved performance of advanced devices.



First stages of film growth for Cu and Ni on Si from sulphate solutions. Inhibition of the reduction process in Ni leads to a decrease of the tendency to faceted growth



Transition from faceted to globular growth in Co-Pt due to an increase in current density

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Education:

One PhD student (I. Zana) graduated and is presently a post-doc at GA Tech. Three graduate students (G. Ofori-Boadu, W. Shao, X. Xu) and one post-doc (G. Pattanaik) are contributing to this work.

A graduate course on the electrodeposition of metals has been offered three times, both at U. of Alabama and U. of Virginia.

Lectures on “How to make materials with electrochemistry” have been offered in the framework of an undergraduate course at U. Virginia on “Materials that shape civilization”

Outreach:

Various demonstration on the impact of electrochemistry in our daily lives – from corrosion to the production of components for cell phones, cars and computers have been offered to high school and visiting undergraduate students.



Gyana Pattanaik with students at the 2003 UVA Materials Science Majors Open House.