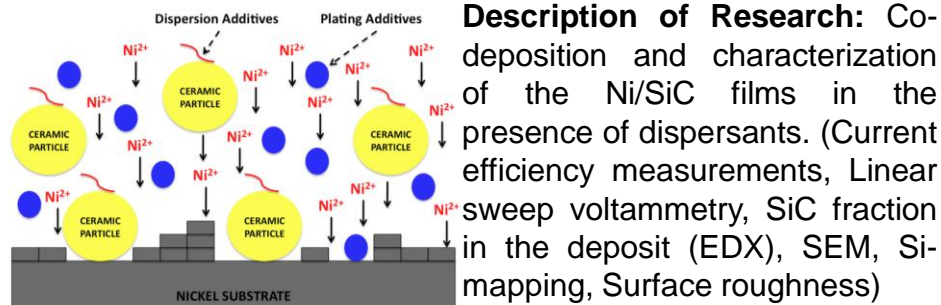


# Ceramic Particle Incorporation into Electrodeposited Films

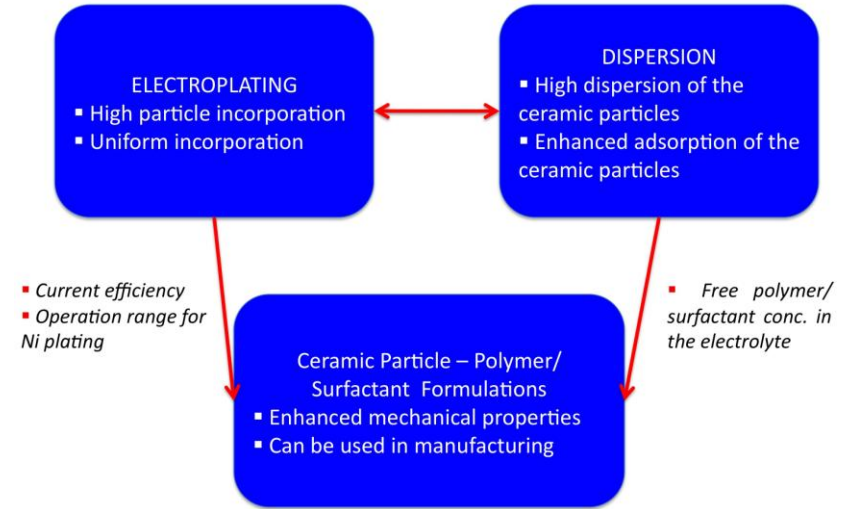
**Motivation:** Chromium and cadmium used in coatings in airplane parts are planning to be replaced due to environmental regulations. Ni/SiC composites for these coatings has attained a great significance as a result of their high anti-wear, hardness and anti-corrosion properties.

**Objective:** Characterize the ceramic particle incorporation in the deposit as a function of system variables. Develop a model that can describe the co-deposition mechanism of Ni and ceramic particles.

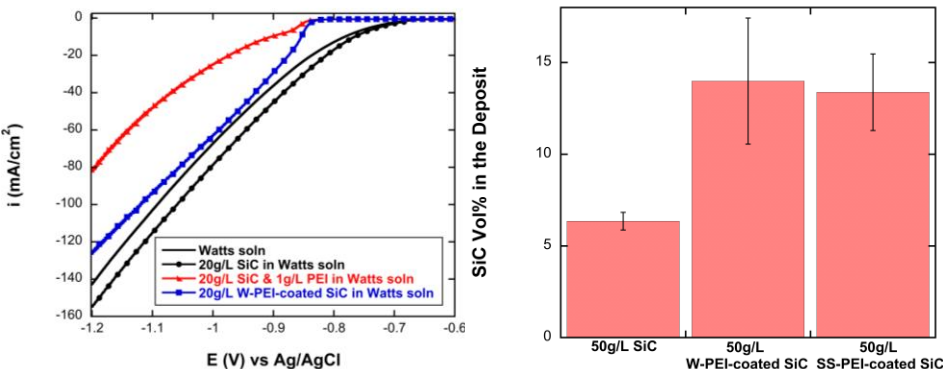


**Description of Research:** Co-deposition and characterization of the Ni/SiC films in the presence of dispersants. (Current efficiency measurements, Linear sweep voltammetry, SiC fraction in the deposit (EDX), SEM, Si-mapping, Surface roughness)

**Major Challenges:** A key challenge in electrolyte design for Ni/SiC co-deposition is that the dispersants that are used to improve the stability of SiC particles in the electrolyte may also affect the electrodeposition kinetics significantly.



**Results:** A pre-coating procedure for the SiC particles with a cationic polymer (PEI) is developed. With this method, highly dispersed plating solutions that result in high SiC loadings without any decrease in current efficiency can be obtained.



## Primary Researcher and Contact Information:

Damla Eroglu  
E-mail address: de2227@columbia.edu

## Publications:

Eroglu D., West A.C., "Mathematical modeling of Ni/SiC co-deposition in the presence of a cationic dispersant", submitted.  
Eroglu D., Vilinska A, Somasundaran P., West A.C., "Effect of a cationic polymer, polyethyleneimine, on Ni/SiC co-deposition", *J. Electrochem. Soc.*, Vol 160, Issue 2, D35-D40 (2013).

## Collaborators and Funding:

Prof. Somasundaran in EEE @ CU, The Boeing Company

