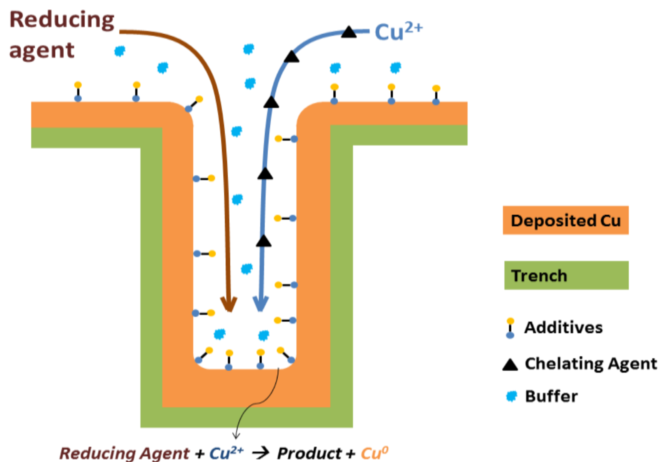
10nm and Beyond Metallization Technologies —With Copper Electroless Deposition

Objectives:

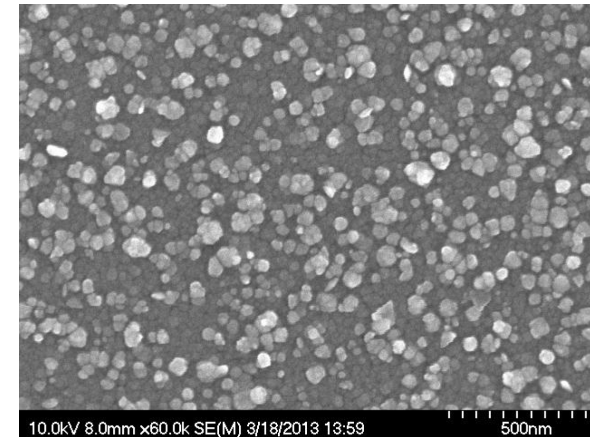
Identify and optimize the key parameters that affect nucleation density of copper electroless deposition on desired substrates in order to minimize the coalescence thickness..



Main Questions:

How do chemistry, operating conditions and substrate properties impact nucleation and deposition behavior? What are the mechanisms of nucleation and deposition?

Major Challenge:
Current electroless deposition method creates nuclei in 3-dimensional structure, which constraints film from coalescing at low thickness. Solution instability is a tradeoff to achieve high deposition rates.



Description of Research:

Utilize in-situ electro-analytical and weight-gain monitoring techniques to characterize the behavior of electroless deposition under different parameters

Understand their impact on minimum coalescence thicknesses with advanced imaging tools.

Benefits of Research Efforts:

Electroless deposition is a very promising candidate to replace electrodeposition in future generation metallization technique.

This project aims to understand the practical lower limit of complete film thickness with this technique and provide insights into how it could be manipulated with varying parameters

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