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Atomic Layer Etching of Metals with Anisotropy, Specificity and Selectivity JANE CHANG, YANTAO XIA, PHILIPPE SAUTET, XIA SANG, UCLA — This talk addresses key challenges in atomic layer etching (ALE) of metals, a relatively new field that is expected to grow rapidly given the major advancements potentially enabled via metal incorporation throughout the manufacturing process of integrated circuits. To realize atomic precision in removing etch-resistant materials with complex compositions or structures, the surface reactivity replaces etch rate as the parameter of interest to control the chemical contrast needed for selectivity. The desirable etching anisotropy dictates the usage of directional ions. A find control of the ion energy and neutral-to-ion ratio could be the gateway of reactivity control, which is demonstrated with recent progress on thermal-plasma ALE of various metals, including Ni, Co, and Cu. The effect of surface reactivity is studied from first principle atomistic calculations and confirms the experimental findings.

Jane Chang
UCLA

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