

Post-CMP Cleaning Formulation with Superior W, Cu, and Co Compatibility

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In the most advanced node of back end of line (BEOL) semiconductor manufacture process, complicated and delicate interconnect metallization structure is usually present. In a single post CMP clean process, clean chemical can contact various materials and fine structures. These fine metal lines or plugs are more fragile to chemical corrosion and has lower tolerance for small particle defects. DuPont ACT developed a unique formulation, PCMPSolv™ 3210, which shows excellent compatibility on multiple metals including Cu, W, and Co, as well as non-metal material such as SiN. This alkaline, TMAH-free formulation contains an inhibitor component to provide protection and passivation for W metal while the alkaline environment provides good compatibility for Co and Cu. Besides corrosion performance, this formulation also has high CuOx and CoOx etching capability. This property was previously proved to have good correlation on organic residue clean, as well as reducing oxide growth during Q-time. Also, low adhesion force between particle and wafer substrate from AFM measurement suggests low risk of particle redeposition.

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Preference: Oral Poster

Main subject : Defects and Post CMP cleaning

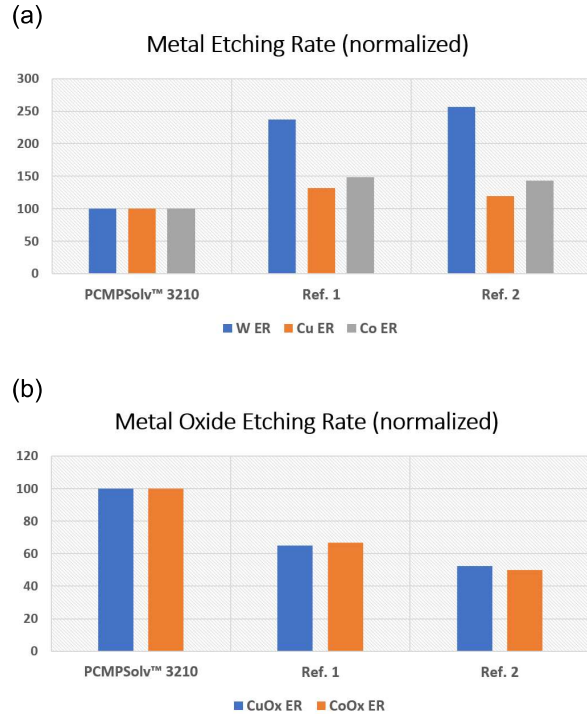


Fig.1. (a) Metal etching rate comparison, and (b) CuOx and CoOx etching rate comparison of PCMP3210 and reference formulations.