Invited talk: Symposium EL15—Ultra-Wide Bandgap Materials, Devices and Systems

MacEtch of β-Ga_2O_3, SiC, and GaN: Plasma-damage-free and High-Aspect-Ratio

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Metal-assisted Chemical Etching (MacEtch), discovered in 2000 for porous Si generation originally, is a local (open-circuit) electrochemical etching method capable of producing anisotropic high aspect ratio semiconductor structures with a simple wet etching process catalyzed by a patterned metal film. MacEtch eliminates plasma and high-energy ion induced damage typically occur in conventional reactive ion etching. Nanowires, vias, trenches, and numerous other patterns have been demonstrated using MacEtch for silicon (Si), germanium (Ge), and compound semiconductors (including GaAs, InGaAs, InP, GaP, SiC, GaN, β-Ga2O3), with unprecedented aspect ratio and sidewall quality. In this talk, we present the MacEtch process and characterization of wide bandgap semiconductors including β-Ga_2O_3, GaN, and SiC.

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