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trimethylaluminum



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Materials Sciences



Crystallography

Epitaxial Graphene Surface Preparation for Atomic Layer Deposition of Al₂O₃

Authors: [N. Y. Garces](#); [V. D. Wheeler](#); [J. K. Hite](#); [G. G. Jernigan](#); [J. L. Tedesco](#); [Neeraj Nepal](#); [Jr. Eddy C. R.](#); [D. K. Gaskill](#);
[NAVAL RESEARCH LAB WASHINGTON DC](#)

Abstract: Atomic layer deposition was employed to deposit relatively thick (30 nm) aluminum oxide (Al₂O₃) using **trimethylaluminum** and triply-distilled H₂O precursors onto epitaxial graphene grown on the Si-face of silicon carbide. Ex situ surface conditioning by a simple wet chemistry treatment was used to render the otherwise chemically inert graphene surface more amenable to dielectric deposition. The obtained films show excellent morphology and uniformity over large (64 mm²) areas (i.e., the entire sample area), as determined by atomic force microscopy and scanning electron microscopy. X-ray photoelectron spectroscopy revealed a nearly stoichiometric film with reduced impurity content. Moreover, from capacitance-voltage measurements a dielectric constant of 7.6 was extracted and a positive Dirac voltage shift of 1.0 V was observed. The graphene mobility, as determined by van der Pauw Hall measurements, was not affected by the sequence of surface pretreatment and dielectric deposition.

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