

Abstract Submitted
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Graphene and Chemically Modified Graphene Nanomechanical Resonators JEREMY ROBINSON, Naval Research Laboratory, MAXIM ZALALUTDNIOV, Global Strategies Group, JEFFREY BALDWIN, JAMES BURGESS, ZHONGQING WEI, PAUL SHEEHAN, ERIC SNOW, BRIAN HOUSTON, Naval Research Laboratory — The facile synthesis of solution derived graphene and CVD graphene films have enabled recent advances in the large-area fabrication of graphene-based nanoelectromechanical structures. In this talk we describe routes to fabricate nanomechanical resonators and our characterization of the resulting structures. We find chemical modification has important consequences in the mechanical response of graphene-based resonators, including quality factor (Q) and Young's modulus (E). Graphene-based resonance structures are formed from both nominally pure graphene films and chemically modified graphene (CMG) formed from graphene oxide. Critically, a composite CMG/ graphene film facilitates the formation of high-quality, low-resistance resonators for incorporation into nanoelectromechanical systems. We further discuss chemical bonding of graphene versus CMG to the underlying substrate and its effect on subsequent quality factors of the resonator structures.

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