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Graphene and chemically modified graphene sensors

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Molecular sensing via sp^2-bonded carbon nanomaterials is a promising research area in both nanoscience and nanotechnology. In general these materials are thermally and chemically stable, come in a variety of different geometries (spheres, tubes, and sheets), and are process compatible with conventional micro-lithographic techniques. In this talk we focus on atomically thin sheets of sp^2-bonded carbon, known as graphene, and discuss their sensing properties when exposed to chemical vapors. The remarkable physical properties of graphene– from near ballistic electron conduction to ultra high stiffness (> 5 times that of steel)– make it a unique system to study both electronic and mechanical transduction modes. Finally, we demonstrate the utility of graphene-based films is greatly expanded after chemical functionalization. In this regard, chemically modified graphene (CMG) is emerging as a material system whose properties are complementary to nominally pure graphene for sensing applications.