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Abstract for an Invited Paper for the TSS13 Meeting of the American Physical Society

The 2-D World of Chemistry: Graphene and Other Interesting Materials

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As recently as 2004 theorist predicted that 2-D materials would not be stable. This view was turned on its ear by the discovery of graphene by researchers in England. Graphene is a single layer of graphite. It exhibits the highest electron mobility at room temperature of any material, thermal conductivity approaching diamond, and the highest tensile strength of any material ever measured. Details of these properties and the methods of producing graphene will be presented. This discovery prompted a worldwide research race to study graphenes properties but also ways to produce graphene cheaply. In this talk a method developed at Texas State will be described that produces graphene at lower cost than any other process. This method also produces graphenes that are functionalized at the edges allowing a host of new chemistries to be performed. Several applications of the graphene will also be presented. In addition a new 2-D material based upon transition metal cyanides has been developed in my laboratory. The talk will also discuss some of the unique properties of this new material.