



## **Sonochemical production of graphene: a route to applications**

Mildred Quintana

Instituto de Física, Universidad Autónoma de San Luis Potosí, SLP, México  
[mildred@ifisica.uaslp.mx](mailto:mildred@ifisica.uaslp.mx)

### **ABSTRACT**

Graphene is the thinnest known material and the strongest ever measured, it shows record thermal and electronic conductivity and stiffness, it is impermeable to gases and it has the right proportion between brittleness and ductility. As consequence, graphene has rapidly emerged as a rising star in the field of material science. In this direction, several methods have been established for graphene preparation. However, most of them remain as demonstration techniques, mainly for basic research, and for providing proof of concept devices. Instead, the recent progress in making stable graphene dispersions by ultrasonication techniques allows the production of graphene sheets on a more preparative scale and permits the manipulation of the layers by chemical reactions. Then, chemically manipulated graphene samples can be incorporated more easily into new functional materials or can be modified for the formation of other carbon nanostructures. Here, I will present our recent efforts toward 1) producing graphene stable dispersions suitable for chemical modification; 2) organic functionalization approaches performed in graphene dispersions that modify its chemical and structural properties, i.e. MWNTs production by rolling up a graphene sheet; and finally 3) an application where functionalized graphene with a tailored distribution of polycationic ammonium pendants provides an sp<sup>2</sup> carbon nanoplatform to anchor a tetraruthenate catalyst, mimicking the oxygen evolving center in natural photosynthesis.