

ABSTRACT

GRAPHENE NANORIBBONS PREPARED FROM CARBON NANOTUBES VIA ALKALI METAL EXPOSURE

In various embodiments, the present disclosure describes processes for preparing functionalized graphene nanoribbons from carbon nanotubes. In general, the processes include exposing a plurality of carbon nanotubes to an alkali metal source in the absence of a solvent and thereafter adding an electrophile to form functionalized graphene nanoribbons. Exposing the carbon nanotubes to an alkali metal source in the absence of a solvent, generally while being heated, results in opening of the carbon nanotubes substantially parallel to their longitudinal axis, which may occur in a spiralwise manner in an embodiment. The graphene nanoribbons of the present disclosure are functionalized on at least their edges and are substantially defect free. As a result, the functionalized graphene nanoribbons described herein display a very high electrical conductivity that is comparable to that of mechanically exfoliated graphene.

Figures 2A - 2D