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Transparent conductive thin film of ultra large reduced graphene oxide monolayers

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Abstract

There is a great interest in the use of graphene sheets in transparent electrods with low cost and high transparency and conductivity. Here, the production of transparent conductive thin film of ultra large reduced graphene oxide monolayers was investigated. Graphene oxide monolayers were produced using a modified Hummers method. Then, the ultralarge monolayers of graphene oxide to about 70 μm as liquid crystalline dispersion were used for production of thin films; which were reduced by hydriodic acid. The produced low cost thin films had high transparency up to 70%, electrical resistance as low as 200 Ω/sq and high mechanical properties as 4.6 GPa in Young's modulus. The improved properties suggest that the produced thin films could successfully be used as transparent electrodes for different applications.

Keywords: reduced graphene oxide; transparent conductive electrode; modified Hummers method; liquid crystallinity.

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