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Graphene/metal nanowire hybrid transparent conductive films

US 20140313562 A1

ABSTRACT

A hybrid transparent conductive film, and methods for fabricating such hybrid transparent conductive films, involving the assembly of two-dimensional graphene-based materials with one-dimensional silver and/or copper nanowires with high optical transmittance and good electrical conductivity. The hybrid films are characterized by a good degree of control of the architecture at the nanoscale level, where the weakness(es) of each component are offset by the strengths of the other components. By rational design of the structure and using simple and locate-cost fabrication methods, hybrid films with sheet resistance of 26 ohm/sq and optical transmittance (at $\lambda=550$ nm) of 83% for reduced graphene oxide/silver nanowire films, and 64 ohm/sq and optical transmittance of 93.6% for monolayer graphene/silver nanowire films have been fabricated. These values are comparable to transparent conductive films based on indium tin oxide but are now able to be used in flexible electronics due to their good mechanical properties.

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