Graphene Application in Energy Storage

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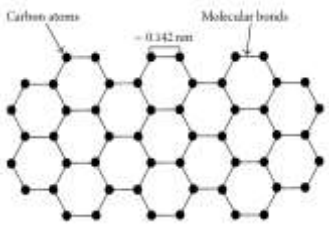
Abstract:

Graphene with its impermeable and conductive nature can replace currently used anticorrosive pigments in coating systems [1-3]. Further, with its considerable strength to weight ratio, graphene can be an essential component in next-generation surface coating additive. The current bottlenecks in using Graphene & Graphene oxide are the availability of cost-effective, high-quality graphene and its effective incorporation (functionalisation and dispersion) into anti-corrosion metal protective coating systems with inhibitors for industrial applications.

On overcoming these factors, protective coatings may prove to be significant demand drivers for graphene in terms of volume consumption. Graphene produced from industrially scalable and cost-effective top-down routes can be chemical / electrochemically / radiation treatment /mechanically the chemically tuned via functionalisation modified for use each Energy storage application, such "additive" Li-ion batteries and Bipolar plate(BPP) coatings for fuel cells – Polymer electrolyte membrane Fuel cells (PEMFC). Further highlights of a chemically tuning Graphene for each application is different.
Keywords: Graphene, Graphene Oxide, Graphene industrial application, Protective coatings, Batteries, Fuel cells



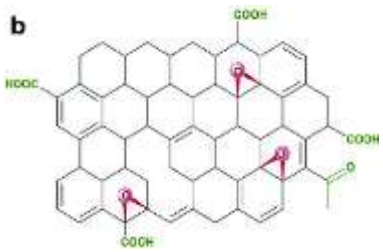


Figure a) Graphene **b) Reduced Graphene Oxide**

Reference:

1) Bohm, S., Graphene against corrosion. Nat Nano, 2014. 9(10): p. 741-742.
2) Graphene Anti-corrosion surface treatment, Flatchem, 1, 2016, (11-16).
3) Liquid phase high shear exfoliated graphene nano-platelets as counter electrode material for dye-sensitised solar cells, Journal of Colloid and Interface Science 499 (2017) 9–1.