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Towards Standardization of Graphene Oxide for Industrial Applications

Abstract

After more than 160 years existence, graphene oxide is now finding use in real industrial processes. First process out is corrosion protection of auto-parts, now being produced by the Swedish company Provexa AB. Other processes in line are production of load-speaker membranes, corrosion protection of PCBs, welding paste for electronic components and additive to polymers. There are also a range of additional promising technologies being developed like stabilizing agent in LiS-batteries, water treatment and sports equipment.

Industry has certain requirements that researchers in R&D-labs do not consider in their everyday lab-scale research. To start up an industrial process, large investments are required, and reliable supply of all the ingredients or components must be in place. Also, reproducible quality is fundamentally essential, as well as predictable and affordable costs. Up to now, graphene oxide has not been readily available in the market other than in small amounts from a range of suppliers each with their own version of GO. In Abalonyx, we have in the last 7 years focused on scale-up of GO and we now have a scalable, safe and cheap process established and verified, so we are in a position that we can sign supply-agreements with industry. It is our hope that this will encourage more industries to dare to invest in the use of this unique material.

Finally, graphene oxide is not only "graphene oxide". It can be modified in a number of ways, by functionalization, doping, partly and fully reduction to graphene-like rGO. Furthermore it can be prepared with larger and smaller sheet-size and it can be more or less oxidized and it can be de-acidified to different degrees and all these varieties can be pillared. All these possibilities should be considered in order to optimize GO for any final application. At Abalonyx we work with all these modifications in different R&D-projects which will be reviewed.

Figures

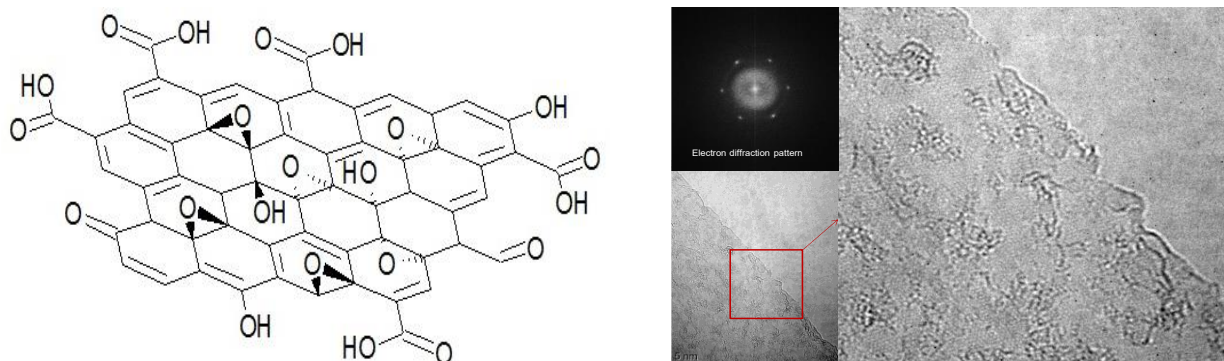


Figure 1: a) schematic illustration of the graphene oxide, and b) TEM-image with electron diffraction insert showing a single layer of GO, and TEM image clearly showing the peculiar structures with oxidized and non-oxidized regions.