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# Graphene Oxide Derivatives, Properties and Applications

## Abstract

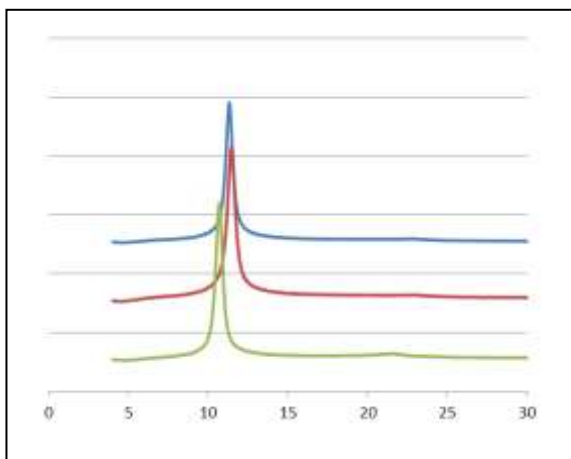
Graphene oxide, as prepared by the so called Hummers method<sup>1</sup> is a solid acidic compound that can be modified in a number of ways. It can be reduced, thermally, chemically or by light to become graphene-like rGO, partly reduced or fully reduced, it can be functionalized to become for example organophilic and it can be doped with N and B. The sheets can be small or large, all these variations giving rise to a family of related compounds with different properties, suitable for different application. Our company aims at offering all these varieties of GO to end-users, in Kg-quantities. In this process, it is essential to understand the stability or shelf-life of all these different forms, as well as the most suitable storage conditions. In Figure 1 and 2 below we compare dispersibility, color and X-ray diffractograms of standard graphene oxide stored for 3 months, 3 years and 6 years respectively, showing that standard GO is fairly stable for years. Now, we have undertaken a much wider study where we store a range of derivatives under different conditions (frozen, cool and ambient). These samples will be analysed regularly over the coming years in order to exactly define the changes that occur and how fast.

Potential applications of graphene oxide and graphene oxide derivatives include such diverse technologies as Load-speaker membranes, water treatment, polymer composites, protective coatings and medical. We see several applications now being piloted around the globe.

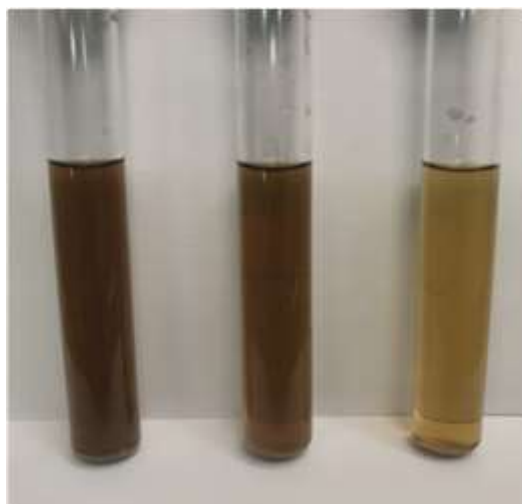
## References

- [1] Hummers, William S.; Offeman, Richard E. (March 20, 1958). "Preparation of Graphitic Oxide". *Journal of the American Chemical Society*. **80** (6): 1339. Authors, Journal, Issue (Year) page (Arial Narrow 11)

## Figures



**Figure 1:** XRD patterns of GO aged 6, 3 and 0.3 years



**Figure 2:** Suspensions of GO aged 6, 3 and 0.3 years