Graphene Oxide for Corrosion Control

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Abstract

Corrosion protection with GO was announced already in 2014 by Su et al. [1], and in several publications since then, but to our knowledge, the Swedish company Provexa AB is the first to implement it industrially, promising strongly reduced corrosion to steel products like automobiles (Figure 1), heat exchangers, pipelines etc [2]. It is perhaps surprising that graphene oxide, being a solid acid with irregular structure can be used to prevent corrosion, and alone it can not. What we see is an example of cleverly designed synergy between GO and other substances.

From the industrial end-user perspective, cost, reliable supply and possible hazards are the most important concerns apart from relevant chemistry. Industrial production costs are strongly related to production volumes. Availability is related to proven production capacity, preferably by more than one producer with proven consistency regarding quality. Possible hazards related to production of GO have now been solved, but potential hazards related to handling of GO and GO-derivates are not yet completely known, but are generally believed to be minor. Such possible hazards are subject of several recent and ongoing studies.

References

[1] Y. Su et al. *Nature Communications volume 5*, Article number: 4843 (2014)

[2] http://provexa.com/en/process/provexa-pluto-2/

Figures

Figure 1: Scania Truck head lamp brackets ACT chamber 6 weeks, equivalent to 3y field use. Piece treated with GO to the left together with different non-GO coatings. Picture provided by Provexa AB.

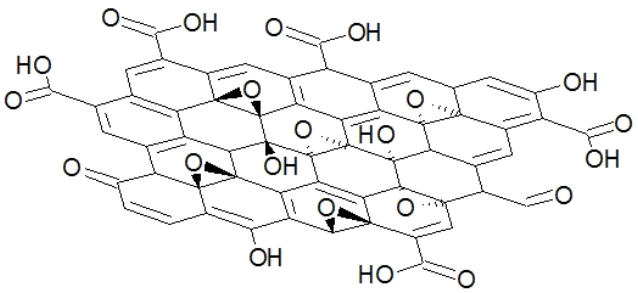

Figure 2: Schematic structure of graphene oxide showing the most abundent functional groups.