

Effect of raw material macro-structure on electrical conductivity of reduced graphene oxide

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Graphite oxidation with subsequent reduction is one of the most promising ways for large scale graphene production. The process includes two stages – firstly graphite is oxidized and secondly the oxidized product – graphene oxide (GO) – is reduced to acquire reduced graphene oxide (RGO). In this study different physical state graphite raw materials were used, to determine the graphite macro-structure influence on the end material. The raw materials used are commercial graphene oxide (GO), graphite flakes (GPa), graphite powder (GPu) and thermally exfoliated graphite (TEG). Oxidation process was done using modified Hummer's method [1] and reduction was done using sodium borohydride (NaBH₄) with cobalt ion (CoCl₂·6H₂O) assistance [2]. The materials were characterized by Raman spectroscopy. The particle size distribution and Zeta potential was determined. Electrical conductivity measurements of GO and RGO samples have been done in temperature range from -150°C to 85°C.

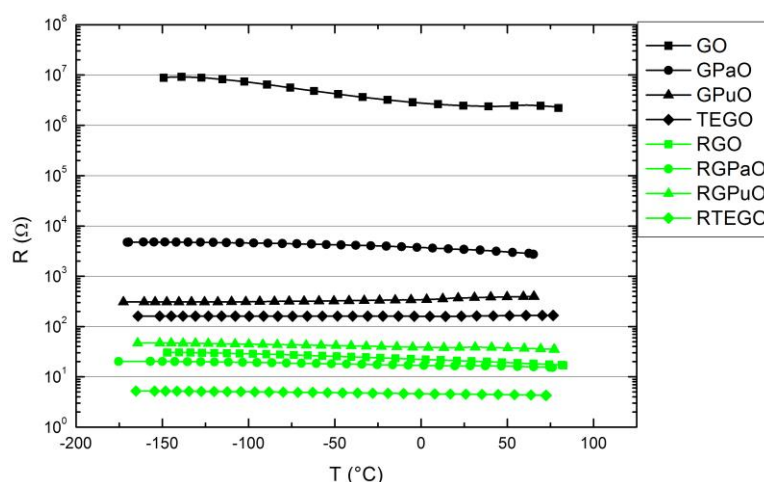


Fig.1 Electrical resistance dependence from temperature of commercial GO, reduced GO, oxidized GPa, reduced GPaO, oxidized GPu, reduced GPuO, TEG oxide and reduced TEG oxide.

References

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