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## Investigating the Effect of SiO<sub>2</sub>-Graphene Oxide Hybrid as Inorganic Nanofiller on Corrosion Protection Properties of Epoxy Coatings

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**Abstract:** In this research, tetraethyl orthosilicate (TEOS) is used as organosilane to decorate the surface of graphene oxide (GO) nanosheets by SiO<sub>2</sub> nanospheres via a facile method. Results of X-ray diffraction analysis, Raman spectroscopy, Fourier transform infrared spectroscopy, field emission scanning electron microscopy, and atomic force microscopy reveal that SiO<sub>2</sub> nanospheres have covered the surface of GO sheets through covalent bonding and SiO<sub>2</sub>-GO nanohybrids are successfully synthesized. Further, the effect of incorporating 0.1 wt.% GO nanosheets and/or SiO<sub>2</sub>-GO nanohybrids on properties of epoxy coatings is investigated. The results show that the pull-off adhesion strength of epoxy coatings to mild steel substrates and the water contact angle on coatings significantly increase via adding SiO<sub>2</sub>-GO nanohybrids. The potentiodynamic polarization test, electrochemical impedance spectroscopy (EIS) and salt spray test results demonstrate that corrosion protection performance of epoxy coatings remarkably enhances by embedding well-distributed SiO<sub>2</sub>-GO nanohybrids compared to GO nanosheets.

**Keywords:** SiO<sub>2</sub>; Graphene Oxide; Nanohybrids; Epoxy; Corrosion.

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