

## X-RAY DIFFRACTION CHARACTERIZATION OF POLYMER INTERCALATED GRAPHITE OXIDE

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Graphite oxide (GO) is generated by treating graphite with strong oxidizers. GO retains the structure of graphite, but with a larger and irregular basal plane spacing. The oxidation of graphite results in the formation of oxygen epoxide groups as well as carbonyl, phenol, and hydroxyl groups. It is the presence of some of these moieties that allows GO to be dispersed in water, allowing for its use in waterborne formulations.

Although GO does not possess the electrical properties of single-sheet graphene, it can be swelled in water, which allows for intercalation of hydrophilic polymer between GO sheets, resulting in a composite that can be coated to produce a continuous film. After coating it may be possible to chemically convert GO to a reduced graphite oxide (r-GO) with improved electrical conductivity. X-ray diffraction (XRD) is ideally suited to evaluate GO-polymer composite samples for evidence of intercalation or exfoliation of GO. Examples of GO-polymer analysis by XRD will be presented, along with results that demonstrate the effect of relative humidity (RH) on neat GO. Knowing the ambient RH during XRD data collection was found to be important in order to correctly assess the extent of polymer intercalation within the GO lattice.