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**Structure Function Relationship in the Variation of Colloidal Behavior of reduced Graphene Oxides and Their Fate in Aqueous Environments** SAMAR AZIZIGHANNAD, SOMENATH MITRA, New Jersey Institute of Technology — Graphene Oxides (GO) contain different oxygen containing groups such as hydroxyl, carboxyl which make them highly hydrophilic or hydrophobic. Cytotoxicity toward bacteria through both membrane and oxidative stress has been demonstrated for GO and reduced graphene oxide (r-GO). While a hydrophobic r-GO can be expected to settle out of aqueous media into solid phases such as river sediments, hydrophilic r-GO will stay dispersed. As a result, the understanding of aqueous behavior of GO and r-GO in aqueous media is of great importance. This paper presents a study of different Go and r-Go and demonstrates that show that solubility decrease with removal of oxygen containing groups and can vary from 7.4 g/ml to nearly insoluble while the hydrophobicity as measured by a hydrophobicity index can increase from -3.89% to 5.2%. Colloidal behavior can also vary quite dramatically where the critical coagulation concentration (CCC) can range from 28 to 15 in presence of 0.5 mmole/l NaCl. The data presented here shows that the fate of GO and r-GO in water, and their fate in water depends upon their structure, which were characterized by SEM, TEM, Raman and TGA.

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