

**Identifying the Superstability Landscapes of Clay-Carbon Nanosheet  
Suspensions**

Sanjay Kumar and \*G. Harikrishnan

*Department of Chemical Engineering, Indian Institute of Technology Kharagpur*

*West Bengal, 721302, India*

---

\* Corresponding author: hari@iitkgp.ac.in; Tel:+913222283928; Fax: +913222255303

Table S1. Scattering length densities of components of suspensions

Component	Molecular Formula	Density (g/cm <sup>3</sup> )	SLD (10 <sup>-6</sup> / Å <sup>2</sup> )
GO	C <sub>1.68</sub> H <sub>3.12</sub> O	0.6	5.5
Laponite	Si <sub>8</sub> Mg <sub>5.45</sub> Li <sub>0.4</sub> H <sub>4</sub> O <sub>24</sub> Na <sub>0.7</sub>	2.65	22.4
Water	H <sub>2</sub> O	1.0	9.5

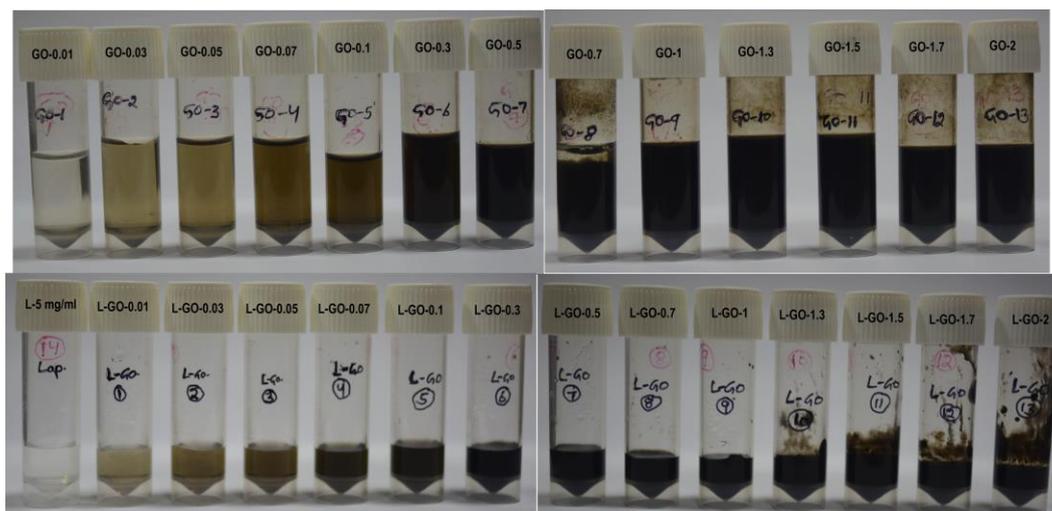


Figure S1: Snapshots of GO and LGO suspensions on the day of experiments. All the samples in the top row are native GO suspensions in water. The first sample in the bottom left row is a pure Laponite suspension following which all the other samples are LGO suspensions. The concentration of GO in suspensions increases from left to right.

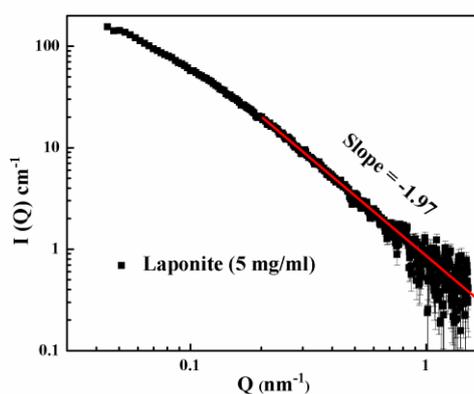


Figure S2. Scattering from bare Laponite suspensions without the presence of graphene oxide. The slope indicates the power law exponent and hence the fractal dimensions of the dispersed Laponite sheets.

Table S2. Dielectric constant and refractive index of components of suspension<sup>1,2</sup>

Material	Dielectric constant ( $\epsilon$ )	Refractive index (n)
Graphene Oxide	4.3	1.8
Laponite	5.0	1.5
Water	78.5	1.3

Table S3. Computed Hamakar constants for different GO, Water and Laponite combinations

System	GO-Water-GO ( $A_{GO}$ )	Lap-Water-Lap ( $A_{Lap}$ )	GO-Water-Lap ( $A_{LGO}$ )
Hamakar Constant	$5.8 \times 10^{-20}$	$1.5 \times 10^{-20}$	$2.8 \times 10^{-20}$

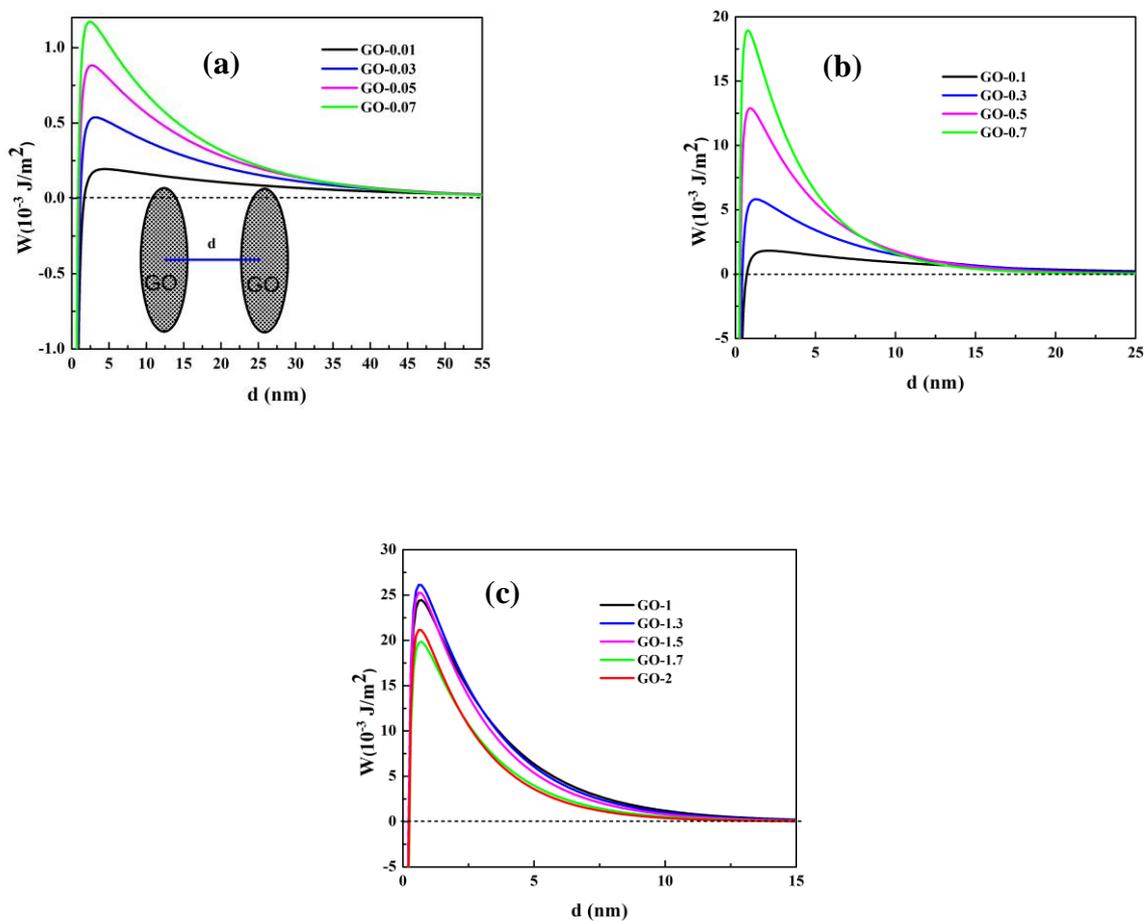


Figure S3. Total interaction potential energies between GO-GO sheets in native GO suspensions that are devoid of Laponite sheets.

## References

1. Liu, J.; Galpaya, D.; Notarianni, M.; Yan, C; Motta, N. Graphene-based thin film supercapacitor with graphene oxide as dielectric spacer. *App. Phys. Lett.* **2013**, *103*, 063108(1-4).
2. Wang, B.; Zhou, M.; Rozynek, Z.; Fossum, J. O. Electrorheological properties of organically modified nanolayered laponite: Influence of intercalation, adsorption and wettability. *J. Mat. Chem.* **2009**, *19*, 1816-1828.