

## Layer-by-layer deposition of anionic graphite oxide and polyaniline into thin films with cationic poly(diallyl dimethyl ammonium chloride)

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### Abstract

In this work, anionic polyaniline (PANI) prepared from the interfacial polymerization of aniline in the presence of polystyrene sulfonate was assembled into layer-by-layers with anionic graphite oxide (GO) using poly(diallyldimethyl ammonium chloride as cationic counter polyelectrolyte. The graphite oxide was produce using a the hummer method and were deposited as anionic counterpart with cationic polyelectrolytes poly(diallyldimethyl ammonium chloride) (PDADMAC). A glass slide substrate was dipped in either solution in a sequential fashion to produce thin films of increasing thickness as a function of the number of deposited layers. The sequence was composed of (PDADMAC-GO-PDADMAC-PANI) $n$  and repeated needed. The increase in UV-Visible absorbance were record using a spectrophotometer as a function of the number of deposited layers and suggested that constant amount of graphene and polyaniline were deposited in each layer which is typical of the layer by layer process. Polyaniline is a pH dependant conducting polymer which electrical and optical properties varies from a doped to un-doped state leading to a color change from green in acid to purple in base. The electrical and optical properties of the composite films were evaluated as a function of pH and using a 4 point probe setup and a spectrophotometer. These composite films could be of interest for the fabrication of electro-optical sensors which would present optical and electrical properties varying as a function of pH for example in food sensing technology.

### References

- [1] Ekarat Detsri, Stephan Thierry Dubas, Colloids and Surfaces A: Physicochemical and Engineering Aspects, **Volume 444** (2014) Pages 89-94
- [2] Chularat Iamsamai, Apinan Soottitantawat, Uracha Ruktanonchai, Supot Hannongbua, Stephan Thierry Dubas, Carbon, **6** (2011) Pages 2039-2045