Department of Chemistry

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तमिलनाडु केन्द्रीय विश्वविद्यालय

Ph.D. Pre-submission Seminar

Name of the student	: Farheen khurshid, Research Scholar (Reg. No: R131501)
Name of the Supervisor	: Prof. S. Nagarajan, Department of Chemistry, CUTN
Title of the Thesis	: Functionalized Graphene Oxide for Gas sensing and Photocatalytic Applications.
Date and Time	: 27.11.2018 & 11.00 AM.
Venue	: Conference Hall (GF), Department of Chemistry, CUTN

Abstract

Graphene, the 2D sp^2-hybridized, one atom thickness of the carbon atoms which arrayed in a honeycomb pattern having thinnest, stiffest and strongest material owing versatile conductor of the both electrical and heat. Graphene inherently exhibited excellent optical, mechanical and transport properties. Notwithstanding the great potential application, it is worth mentioning that, graphene possesses zero band gap as well as chemical inertness, which weakened the efficiency of graphene in the field of optoelectronics and gas sensors. Due to these limitations, numerous researchers are focused on the modification of graphene via chemical and thermal process. In order to tune the chemical and electronic property of modified graphene, further functionalization can be applied through covalent or non-covalent functionalization with organic and inorganic molecules. Graphene oxide (GO) is an excellent material for further functionalization because many oxygen containing functional groups such as (OH), carbonyl and carboxylic (-C=O), ether (-O-) were presented on the surface as well as edge of graphene oxide. This thesis intended at functionalization of graphene oxide via covalent and non-covalent bonding. The covalent functionalization on graphene oxide with small organic molecule was achieved for ammonia gas sensing applications. The functionalized GO exhibits excellent ammonia sensitivity/selectivity rather than the conventional GO based sensor.[1] The influence of different environmental factors such as pressure, humidity and temperature on the ammonia sensitivity of a GO sensor were systematically investigated for the optimization of GO-based ammonia sensor.[2] Intercalation of small organic semiconducting molecules with graphene oxide via non-covalent functionalization attributed to enhancement of optoelectronic properties of graphene oxide.[3] The strategy of non-covalent functionalization on GO/rGO has been used for the improvement of the photocatalytic performance of metal oxides. The high mobility and surface area of GO/rGO enhanced the methyl orange degradation efficiency of metal oxides.[4,5] This work demonstrated the covalent and non-covalent functionalization graphene oxide trolling of the graphene oxide properties for the sensing, optical and photocatalytic application.

References

1. Aryl fluoride Functionalized Graphene Oxide for the Application of Excellent Ammonia Sensitivity/Selectivity, **RSC Advances, 2018, 8, 20440- 20449**.
2. Organic semiconductor/graphene oxide composites as a photo-anode for photoelectrochemical applications, **RSC Advances, 2018, 8, 35959-35965.**
3. Atmospheric Pressure and Humidity Dependent Electrical Conductivity and Ammonia Sensitivity of Graphite Oxide Based Sensor. **Sensor and Actuator B -2018 (Under review)**.
4. Ag doped ZnO Nano rods embeded Reduced Graphene oxide Nano Composite for Photo-electrochemical Applications. **RSC Open Sci. 2018 (Under review)**.
5. MO (M= Fe, Co, Ni, Cu, Zn)/rGO composites for the photocatalytic degradation of methyl orange dye, **Carbon (Communicated)**

All are welcome