Centre for Nano and Material Sciences
JAIN
Declared as Deemed to be University u/s 3 of the UGC Act 1956

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JRF Position in Chemistry/Material Science

Applications are invited for the Junior Research Fellow position for the project entitled "*Synthesis of large area 2D vertical heterostructures of graphene-metal/metal oxide and study their electrochemical and catalytic properties*" at Centre for Nano and Material Sciences (CNMS), JAIN (Deemed-to-be) University, Bangalore, Karnataka in Dr. Manav Saxena research group.

Qualification and Experience:

1. M. Sc. in Chemistry/Physics/Materials science. Candidate should have obtained at least 60% marks in qualifying degree examination.
2. Preference will be given to CSIR-UGC NET (JRF/LS) or GATE qualified candidate.
3. The ability to work closely and collaborate with colleagues is a must. Proficiency in the English language is required.
4. Candidate having hand-on experience in electrochemistry will get preference.

Fellowship: The JRF will be paid stipend as per norms and qualifications. The salary and appointment terms are consistent with the current rules for Ph.D. degree students.

Duration: Initial appointment for 01 year, extendable up to 03 years based on performance. The objective of the 03 years position should be aimed at obtaining a doctoral degree at the JAIN (Deemed-to-be) University Bangalore, Karnataka with peer reviewed publications.

How to apply: The application should contain a detailed resume (including name of at least two references), one photograph, contact details, photocopies of educational/professional qualifications, 01 page summary of research project undertaken (by email/post; email preferred with proper subject line). Please also mention preferred date of joining, if selected. Last date to receive applications by email and post is 15-02-2019.

Only shortlisted candidates will be called for the interview and no TA/DA will be paid for appearing in the interview. Selected candidate will be intimated by email.

About project:

Zero and three-dimensional graphene-metal/metal oxide composites are well known. These composites are synthesized by ex-situ and in-situ approach and a maximum percentage of the graphene surface are not in contact with metal/metal oxide structures. However, such composites materials show promising activity to HER, ORR, energy storage devices, sensing applications etc. If we think about the isolated atomic planes of graphene and metal oxide that can also be reassembled into heterostructures made layer by layer. These heterostructures referred to as 'van der Waals' heterostructures. The properties of vertical/vander Waal heterostructures (graphene and metal oxide layer are in vertical direction and thus called 'vertical heterostructures') are almost unexplored and many more breakthroughs are expected, although at a slower pace. The main problem for vertical van der Walls heterostructure is smaller size and the synthesis of layered Lego's is dependent on exfoliation method from their precursor. The properties of 2D metal oxides are expected to differ from those of their parents (3D counter parts) owing to quantum confinement.

The proposed project is related to the synthesis of layered 2D-metal/metal oxide having a large area and layered graphene-metal/metal oxide vertical-2D-composites materials. The difference activity of poly- and single- crystal graphene as template for nucleation and growth of metal/metal oxide layer to give vertical van der Waals heterostructures is worth exploring. The graphene/rGO could also be used as a substrate to transfer synthesized free standing metal/metal oxide atomic thin layer, as another approach. Upon successful synthesis of 2D-graphenemetal/ metal oxide layered composite, its electrochemical and catalytic properties will be explored in detail.

Contact:

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