



# INDIAN INSTITUTE OF TECHNOLOGY BOMBAY POWAI, MUMBAI 400076.

**Advertisement No.: IRCC/EXT231/2022**

## **Job Title**

Junior Research Fellow

## **Job Reference Number**

50363177

## **Application End Date**

14.10.2022

## **Type of Employment**

Proj. Staff Contract

## **No. of Position(s)**

1

## **IITB Project Recruitment:**

Project title: Synthesis of layered transition metal oxides for optoelectronic applications

About the project: Layered transition metal chalcogenides (TMDs), like  $\text{MX}_2$  (M=Mo, W and X= S, Se) and their heterostructures are promising 2D semiconductors with exotic properties and interesting applications. These TMDs, however, suffer from degradation in ambient conditions due to exposure to air and moisture. This proposal aims to explore alternate air-stable layered semiconductor-layered transition metal oxides, like  $\text{WO}_3$  and  $\text{MoO}_3$ , which combine the benefits of layered chalcogenides with the chemical and thermal stability of oxides. In this project, the synthesis of layered transition metal oxides, like layered  $\text{WO}_3$  and  $\text{MoO}_3$ , will be explored. Liquid and solid precursors will also be used to synthesize large-area films by growth processes similar to layered TMDs. Direct synthesis on different substrates will be used to determine the impact of the substrate on the crystallinity, phase, and microstructure of these films. A system equipped to handle oxidizing and reducing atmosphere will be constructed, where the precursor concentrations can be precisely controlled. Thermodynamic calculations will be used to predict the synthesis window and stability of these materials systems. The structural, optical, and electrical properties of these layered materials will be determined and used to correlate with optoelectronic device performance. Modeling of optical and electrical devices based on the measured properties will be used for designing device architecture to enhanced device performance.

## **Essential Qualifications & Experience:**

Post Graduate Degree in Basic Science OR Graduate / Post Graduate Degree in Professional Course selected through a process described through any one of the following:

a. Scholars who are selected through National Eligibility Tests - CSIR-UGC NET including lectureship (Assistant Professorship) and GATE.

b. The selection process through National level examinations conducted by Central Government Departments and their Agencies and Institutions such as DST, DBT, DAE, DOS, DRDO, MHRD, ICAR, ICMR, IIT, IISc, IISER etc.

## **Job Profile:**

Required skills:

1. Good competence in one or more of the project areas. Prior hands-on-experience in any of these

areas will be useful.

2. Basic knowledge in synthesis, optoelectronics, nanoelectronics, mathematical aptitude and programming skills.
3. Experience in working with a vacuum-based deposition tool and semiconductor cleanroom would be preferred.

In this project the candidate will gain proficiency in the following aspects:

1. Experimental skills needed for handling the synthesis equipment and conducting the experiments.
2. Programming and simulation skills needed for the relevant parts of the project.
3. Analysis and interpretation of results for designing further experiments.
4. Presenting and communicating results efficiently.

***Pay Details:***

Consolidated salary Rs.31000/- p.m. + HRA

***General information:***

The position is temporary for a period of 6 Months and tenable only for the duration of the project. The appointment is for time bound project and the candidate is required to work mainly for the successful completion of the project. The selection committee may offer lower or higher designation and lower or higher salary depending upon the experience and performance of the candidate in the interview.

Candidates called for interview will be required to attend at his/ her own expenses.

For any queries/clarification please contact: [recruit@ircc.iitb.ac.in](mailto:recruit@ircc.iitb.ac.in)