Post-doc position
Atomic resolution characterization of transition metal dichalcogenide (TMD) monolayers by advanced transmission electron microscopy

A post-doc position is available for a research subject on atomic resolution characterization of transition metal dichalcogenide (TMD) monolayers by advanced transmission electron microscopy in CEA Grenoble, France.

Background

Properties and quality of TMD atomically thin films strongly depend on their atomic structure including chemical distribution of component elements. Thus, visualizing the local structure with chemical information at the atomic scale is one of the most important analytical steps in order to optimize the TMD elaboration process, to understand the fundamental physics and further to control the 2D device units. Low-voltage aberration corrected transmission electron microscopy (LVAC-TEM) has been developed for the study of 2D atomically thin layers since last years, which can provide atomically resolved images without damaging the layers. However the practical use of these techniques is still remaining to be fully developed because the atomic scale TEM analysis of 2D monolayers includes a lot of critical factors such as sample preparation, damage control, and image simulation.

Research Objectives

Within this subject we will study the atomic structure of transition metal dicalchogenides (TMDs) grown by MBE based van der Waals epitaxy using advanced LVAC-TEM techniques in order to understand the growth mechanism and their optical, electronic and spintronic properties. In addition, the fundamental physics and dynamics such as phase transition and defect formation will be studied via in-situ observation, in collaboration with the INAC theoretical team. The work will be done within a multi department CEA consortium ranging from basic to applied research.

This work includes a development of analytical methods to visualize the atomic structures of TMD monolayers with detailed chemical and quantitative information, associating various techniques such as Z-contrast STEM imaging, TEM exit wave reconstruction and EELS spectroscopy.

We are looking for a dynamic candidate who is interested in both the nano-characterization techniques and the 2D materials. The candidate must possess PhD degree in a relevant

subject. A background in TEM characterization is essential and experiences in 2D materials will give an extra merit.

Financial support

CEA contract, 24 months

Location

At Minatec characterization facilities in Grenoble, a Monochromated FEI Titan Ultimate TEM with Cs image and probe correctors and Gatan energy filter is available for TMD based materials study. Additional TEMs available include a FEI Themis equipped with a probe Cs corrector and Super X detectors for EDX chemical analysis.

CEA: http://portail.cea.fr/
MINATEC: http://www.minatec.org/
INAC: http://inac.cea.fr/

How to apply

Applicants are required to provide:

- Academic CV
- Full list of publications (preprints of unpublished papers are also accepted)
- Cover letter outlining your suitability for the position
- Contact details and/or recommendation letters of referees

Contact

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