



Seminar Topic:

Operando Transmission Electron Microscopy Applied to Perovskite Solar Cell Devices

Assistant Professor Martial Duchamp

Abstract

Assistant Professor Martial Duchamp's research group is focused on the applications of *in situ* and *operando* techniques inside a transmission electron microscope (TEM). These approaches allow us to investigate devices under operation inside a TEM using heating and biasing (employing TEM Protochip and DENSSolutions holders). This presentation will focus on electrically contacted perovskite solar cell devices. The degradation of the perovskite solar cell is monitored inside the TEM and the creation of the unwanted PbI_3 phase is located at atomic scale while cycling the devices. The *operando* TEM experiments are combined with chemical analysis, high resolution imaging and electron beam induced current (EBIC) analysis. The overall aim is to provide new insights on the influence of the local atomic configurations on the electrical properties of the devices. These techniques allow finer analysis of the device properties which are not possible with other characterization techniques.

Biography

Assistant Professor Martial Duchamp received his Master of Engineering and Research degree from the Ecole Nationale Supérieure de Physique, Grenoble (ENSPG-INPG), France in 2005 and his Ph.D. degree from the Department of Physics at the Ecole Polytechnique Fédérale Lausanne (EPFL), Switzerland in 2010, where he studied the growth, electrical and mechanical properties of ZnO nanowires. After being a postdoctoral researcher at Danmarks Tekniske Universitet (DTU), Copenhagen, Denmark, he joined the Research Centre Jülich in The Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons (ER-C) Institute in 2011. In 2016, he joined NTU as an Assistant Professor.

**Wednesday, 11 October 2017 || Time: 2:00 pm – 3:00 pm ||
Venue: MSE Meeting Room (N4.1-01-28)
Hosted by: Professor Tim White**