

# 72nd GREEN Open Seminar

2019/5/31 (Fri) 15:00~16:00

Venue : Auditorium, 1F, NanoGREEN/WPI-MANA Bldg., Namiki Site, NIMS

## The Engineering of Surfaces: from particles to solar cells

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### Abstract

The chemistry of the uppermost nanometre or two of a surface govern a very wide range of properties from how particles interact with each other to the electronic properties of multilayer devices. At this scale, the properties of materials can change significantly from their bulk properties with, for example, gold going from an inert, stable metal in the bulk to an excellent catalyst when the particle size is less than a nanometre. Being able to understand and ultimately manipulate the chemistry and physics of these layers to achieve specific properties and purposes is an on-going challenge for materials scientists and nanotechnologists across the world.

In this presentation, I will focus on recent research in two quite different areas:

- i. The manipulation of the surface chemistry of particles to control their interaction and the rheological behaviour in nanofluids. In this part of the presentation, I will discuss the modification of particles through very high attachment density, uniform layers and the surprising rheological behaviour of these particles in high solids fluids.
- ii. The workfunction of interfaces in OPV's are critical to maximise electron and hole transport across the layers, yet depending on how the subsequent layers are deposited, the structure and the properties may not be what is expected. In this part, I will discuss recent results on the chemistry and electronic properties of metal oxides, such as molybdenum oxide deposited as thin films on polymer substrates and how the workfunction changes upon exposure to moisture.