

**Title** Carbon Nanotube Thin Films for Touch Sensor and Green Energy Applications

**Speaker** Prof. Esko Kauppinen  
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**Date & Time** Friday, July 10, 2015 4:30 p.m.

**Place** I<sup>2</sup>CNER Hall, Ito campus, Kyushu University

**Abstract**

Rare metals have high socio-economical and technological importance, while being prone to supply-demand fluctuations. Indium is currently used as ITO (indium-tin oxide) to provide transparent conducting films for a wide variety of consumer electronics devices and green energy applications e.g. solar cells. Recent introduction of bendable as well as flexible - and even stretchable - devices requires novel materials to replace ITO, due to its rigid nature. In order to replace indium, which is the typical rare metal heavily used for transparent conductive films (TCF), we have developed single-walled carbon nanotube (SWNT) thin films. Here we introduce our industrial scale, ISO 9001:2008 certified direct dry printing (DPP) manufacturing of nanotube-based TCFs developed at Canatu Ltd. (<http://www.canatu.com>), enabling the manufacturing of TCFs with electrical properties on par with those of ITO-on-PET, and with optical properties better than those of ITO, metal nanowire and metal mesh. We introduce EU-Japan joint project IRENA (Indium Replacement by Carbon Nanotube Thin Films, <http://irena.aalto.fi/>), aiming to replace indium in ITO-based TCFs and also both indium and gallium in IGZO thin film field effect transistors (TFT-FET). Here SWNT electrodes have also been demonstrated in high efficiency silicon, polymer and perovskite solar cells. In addition, we present our recent results to use graphene coated metal nanoparticle - SWNT hybrids as OR and HER reaction catalyst.

**About the Speaker**

**Education**

M.Sc. (1985) and (PhD) (1992), University of Helsinki, Department of Physics, Helsinki, Finland

**Major Positions**

- \* Professor (Tenured), Aalto University School of Science, Department of Applied Physics, 2005 - present
- \* Leader, Nanomaterials Group, Aalto University School of Science, Department of Applied Physics; 2002-pres.
- \* VTT (Technical Research Centre of Finland) Research Professor on Nanotechnology, 2000-2010
- \* Chief scientist and leader of Aerosol Technology Group at VTT, 1993-2000
- \* Junior scientist, scientist and senior scientist at VTT, 1983-1993

**Host:** Professor Naotoshi Nakashima

For registration, please visit our website:

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