



澳門大學
UNIVERSIDADE DE MACAU
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應用物理及材料工程研究院
INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS
INSTITUTE OF APPLIED PHYSICS AND MATERIALS ENGINEERING

IAPME Seminar

Recent Improvements of Perovskite Nanocrystals for Light-Emitting Devices



24 June 2025

Prof. Andrey L. Rogach
City University of Hong Kong

Venue: N23-4018

Time: 15:00 - 16:00

Hosted by: Prof. Handong SUN

Abstract

Chemically synthesized metal halide perovskite nanocrystals have emerged as a new class of efficient light emitting materials which are particularly interesting for development of light-emitting diodes (LEDs). Stability of perovskite-based LEDs is still an issue, which can be partially mitigated by proper interface design, such as the use of inter-layer amine terminated carbon dots. As for many other nanocrystals, proper surface passivation is a key to ensure high colloidal stability and processability of perovskites; this can be achieved by employment of chelating ligands. Very recently, we employed the lead-free CsSnI₃ perovskites for efficient and rather stable near-infrared LEDs. There have been plenty of efforts towards synthesis of core-shell perovskite nanocrystals with anticipated enhanced optical properties and stability, which is however not an easy task; some recent examples of such efforts on-going in my group will be demonstrated.

Biography

Prof. Andrey L. Rogach is a Yeung Kin Man Chair Professor in Photonics Materials at the Department of Materials Science and Engineering, and the Founding Director of the Centre for Functional Photonics (CFP) at City University of Hong Kong. He received his Diploma in Chemistry (1991, with honors) and Ph.D. in Physical Chemistry (1995) from the Belarusian State University in Minsk studying formation and properties of silver nanoparticles in different media. He worked as a postdoc (with Horst Weller) and then as a staff scientist at the Institute of Physical Chemistry of the University of Hamburg, Germany from 1995 to 2002. From 2002–2009 he held a tenured position of a lead staff scientist at the Department of Physics and Centre for NanoScience of the University of Munich, Germany, where he completed his habilitation in Experimental Physics on light emission and harvesting with semiconductor nanocrystals. He joined City University of Hong Kong as a Full Professor in 2009 and has been advanced to Chair Professor in 2012. His research focuses on synthesis, assembly and optical spectroscopy of colloidal semiconductor and metal nanocrystals and their hybrid structures, and their use for energy-related and optoelectronic applications. His distinctions include the RGC Senior Research Fellowship (Hong Kong, 2023), the Croucher Senior Research Fellowship (Hong Kong, 2019), the Carl Friedrich von Siemens Research Award of the Alexander-von-Humboldt Foundation (Germany, 2018), to name but a few. He holds honourable appointments at Trinity College Dublin (Ireland), Xi'An Jiaotong University, and Soochow University (China). Andrey Rogach is a Foreign Member of the Academia Europaea, and a Fellow of the Electromagnetic Academy, USA. He served as an Associate Editor of ACS Nano in 2011-2023.

Enquiry: iapme.enquiry@um.edu.mo