



Department of  
Mechanical Engineering  
The University of Hong Kong



## SEMINAR

(onsite and online)

### **FeSe nanoparticles: synthesis, characterization and application on biomedical and photonics**

Date: 22 August, 2023 (Tuesday)  
Time: 11:00 a.m. (HKT)  
Venue: Room 7-35  
Haking Wong Building  
HKU

Speaker: Prof. Jaebeom Lee  
Department of Chemistry  
Chungnam National University  
Republic of Korea

Join Zoom Meeting:

<https://hku.zoom.us/j/94527275524?pwd=YUFQanFncHlpeHhKOWw1aUdUUTZXdz09>

Meeting ID: 945 2727 5524

Password: 194900

#### Abstract:

Layered transition metal chalcogenide nanostructures reveal unprecedented electronic and optical properties due to the unusual arrangement of interlayers and electronic interactions between them. Here, we report layered FeSe nanoparticles (NPs) coupled by *L*- or *D*-cysteine as a chiral stabilizer to show multi-colored excitation dependent emission (MEDE) for both single- and two-photon photoluminescence breaking conventional Kasha and Vavilov rules of luminescence, which is the first report in inorganic nanostructure system. Structural analysis shows the chiral stabilizer-induced interlayer spacing expansion in a FeSe NP. The MEDE in FeSe NPs is revealed to originate from the impurity coupled to the Mott insulator character of FeSe and chiral interlayer expansion through the first-principles electronic structure calculations and the classical molecular dynamics. Taking advantage of biocompatibility and multiphoton excitation in FeSe NPs, MEDE was utilized for bio-imaging of neuron cells and tissues altering excitation wavelength from visible to near-infrared range expanding the capabilities of multi-color bio-labeling.

**References:**

1. Nano Today, Volume 43, April 2022, 101424
2. Advanced Functional Materials, 33, 2023, 2300927
3. Science advances, 5, 12, eaay0044, 2019

**Biography:**

**Prof. Jaebeom Lee is a professor in the Department of Chemistry, Chungnam National University. He studied Chemistry at Chungnam National University, Korea (1998), and received his Ph.D. from Chemistry at The Robert Gordon University, United Kingdom in 2003 (advisor: Prof. P. Robertson). Subsequently, he worked at the Department of Chemical Engineering, University of Michigan, Ann Arbor, as a postdoctoral researcher from 2003 to 2007 with Prof. N. A. Kotov. Upon completion of his postdoctoral studies in 2007, he traveled back to Korea to assume Assistant Professorship of Nanoscience and Nanotechnology at Pusan National University. Then, in 2018, he came back to his alma mater, Chemistry Chungnam National University to take up his current position of Professor of Chemistry at Chungnam National University. The research of his group (<https://scholar.google.com/citations?user=vTHzFWAAAAAJ>) is currently dedicated to nanoparticle synthesis and assembly, magnetic separation, biosensor. His research works have been highly cited by his peers (total citation = 11,900 and H-index = 48 based on Google Scholar). His works have been also recognized by many research awards, including Research Excellence Award, NRF, Ministry of Science, ICT and Planning (2017), 40 Inventions of the Year, Nano Korea (2014), Premier Research Faculty Award, PNU (2011), Best Research Faculty Award, College of Nanosci. and Nanoeng., PNU (2011), Best Research Faculty Award, College of Nanosci. and Nanoeng., PNU (2009), New Faculty Award, Korea Research Foundation (2007), Young Scientist Award, Korea-USA Nano Forum (2007), LG Micron Ind /Aca Research Scholarship Award, U of Michigan (2006), Science & Engineering Education Scholar Program (SEESP) Award, U of Michigan (2005), Newport Research Excellence Award, U of Michigan (2004), Research Student Education Scholarship Award, The Robert Gordon University (2002), Research Student Fellowship Award, The Robert Gordon University (1999), SPIE Student Travel Grant Award, The Robert Gordon University (2000 and 2001), and Excellent Achievement Scholarship Award, Chungnam National University (1991 and 1997).**

**ALL INTERESTED ARE WELCOME**

**For further information, please contact Dr. D.M. Shin at 3917 8061.**