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INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS
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LAPME Seminar

Surface Modification and Optical Property Investigation of Low-Dimensional Semiconductors

Prof. Rui CHEN

Southern University of Science and Technology

Date: 08/11/2023; Time: 14:30-15:30; Venue: N23-4018

Photonic integration has become one of the most important technological tools to break Moore's Law. Low-dimensional semiconductor materials are the basis of this research field. Unfortunately, a large number of surface defects exist in low-dimensional semiconductor materials, which greatly affect their optoelectronic properties. In this talk, the optical properties and stability enhancement strategies of low-dimensional perovskite materials will be discussed. For growth strategies, A or B cations incorporation based on strain compensation, core-shell structure to suppress ion immigration. Moreover, for post-treatments, surface hydrophobic modification, surface encapsulation induced self-structural healing and laser irradiation results in secondary crystallization will be introduced. In the second part, the surface modification and photophysical study of colloidal CdSe nanoplatelets will be presented. It is found that the surface defect of CdSe nanoplatelets are mainly located on the lateral surfaces of the materials, and the defects can be effectively passivated by the core-crown structure, leading to improved optoelectronic properties of the materials. The research conducted herein will be helpful for the application of low-dimensional semiconductor materials for optoelectronic devices.



Prof. Rui CHEN is currently a professor in the Department of Electrical and Electronic Engineering at Southern University of Science and Technology. He graduated from the Department of physics, Xiamen University with a Bachelor degree in 2005. Then he received his Ph.D degree in Applied Physics from Nanyang Technology University, Singapore. He has published more than 150 journal papers with a total citation more than 7,000 (h-index 50). His main research interests include laser spectroscopy, optical characterization of materials, optical microcavities and micro-nano lasers.

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