黄昆半导体科学技术论坛

**第303期讲座**

**报告题目:** **High efficiency organic-inorganic hybrid perovskite light-emitting diodes**

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**摘要：**Organometal halide perovskites have been intensively studied as promising materials for solar cells and light emitting diodes due to their excellent semiconducting properties, broad range of light absorption, and high colour purity emission. Here we present advances in this field, such as the use of a novel self-organized hole transporting layer and its application to solution-processed lead halide perovskite solar cells and bright perovskite light-emitting diodes. Using the new hole transport layer, we demonstrate bright and efficient PeLEDs in a range of colours. We also report a systematic approach to achieve high-efficiency green perovskite LEDs in a simplified bilayer structure with comparable efficiency those of phosphorescent organic light-emitting diodes. Finally, we demonstrate a highly flexible perovskite LED based on a self-organized conducting polymer anode and the first large-area PeLED. These results show the great potential of perovskite LEDs in the display/lighting industries as an alternative for organic LEDs and quantum dot LEDs.

[1] H. Cho+, S.-H. Jeong+, M.-H. Park+, T.-W. Lee\* et al., *Science*, 350, 1222 (2015).

[2] H. Kim+, K.-G. Lim+, T.-W. Lee\*, *Energy & Environmental Science* 9, 12 (2016).

[3] Y.-H. Kim+, H. Cho+, J. H. Heo+, S. H. Im\*, and T.-W. Lee\*, *Advanced Materials*, 27, 1248 (2015).

**简历：**Tae-Woo Lee is an associate professor in the department of materials science and engineering at Seoul National University, Korea. He received his Ph.D in chemical engineering from KAIST, Korea in February 2002. Then, he joined Bell Laboratories, USA as a postdoctoral researcher in 2002. From September 2003 to August 2008, he worked in Samsung Advanced Institute of Technology, Samsung Electronics as a member of research staff. From August 2008 to August 2016, he was an assistant and then an associate professor in the department of materials science and engineering at Pohang University of Science and Technology, Korea. He received a prestigious Korea Young Scientist Award from the President of Korea in 2008 and The Scientist of the Month Award from the ministry of science, ICT and future planning in 2013. He is author and co-author of 139 papers including Science, Nature Photonics, Science Advances, Nature Communications, PNAS, as well as inventor and co-inventor of 339 patents (155 Korean patents and 184 international patents). His research focuses on organic, organic-inorganic hybrid perovskite, and carbon materials and their applications to flexible electronics, printed electronics, displays, solid-state lightings, solar energy conversion devices, and neuromorphic devices.

**时间: 2017年7月6日 (星期四) 下午4:30**

**地点: 中国科学院半导体研究所图书馆101会议室**

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