

Special Topic on *In-Situ* and *in-operando* Characterization of Semiconductor Materials and Devices

Guest editors: Xiaoxing Ke and Yong Zhang

■ RESEARCH HIGHLIGHTS

040201 **Inorganic electron-transport materials in perovskite solar cells**

[4 pages] Lin Xie, Lixiu Zhang, Yong Hua, and Liming Ding

040202 **Stabilizing α -phase FAPbI₃ solar cells**

[3 pages] Yaxin Wang, Xin Zhang, Zejiao Shi, Lixiu Zhang, Anran Yu, Yiqiang Zhan, and Liming Ding

040203 **Frontier applications of perovskites beyond photovoltaics**

[3 pages] Luyao Mei, Haoran Mu, Lu Zhu, Shenghuang Lin, Lixiu Zhang, and Liming Ding

■ EDITORIAL

040101 **Preface to the Special Topic on *In-Situ* and *in-operando* Characterization of Semiconductor Materials and Devices**

[2 pages] Xiaoxing Ke and Yong Zhang

■ REVIEWS

041101 **In-situ/operando characterization techniques for organic semiconductors and devices**

[11 pages] Sai Jiang, Qinyong Dai, Jianhang Guo, and Yun Li

041102 **Comprehensive, *in operando*, and correlative investigation of defects and their impact on device performance**

[12 pages] Yong Zhang and David J. Smith

041103 **Study of structure-property relationship of semiconductor nanomaterials by off-axis electron holography**

[10 pages] Luying Li, Yongfa Cheng, Zunyu Liu, Shuwen Yan, Li Li, Jianbo Wang, Lei Zhang, and Yihua Gao

041104 ***In-situ* monitoring of dynamic behavior of catalyst materials and reaction intermediates in semiconductor catalytic processes**

[14 pages] Zhen Fang, Yao Liu, Chengyi Song, Peng Tao, Wen Shang, Tao Deng, Xiaoqin Zeng, and Jianbo Wu

041105 **Structural evolution of low-dimensional metal oxide semiconductors under external stress**

[7 pages] Peili Zhao, Lei Li, Guoxujia Chen, Xiaoxi Guan, Ying Zhang, Weiwei Meng, Ligong Zhao, Kaixuan Li, Renhui Jiang, Shuangfeng Jia, He Zheng, and Jianbo Wang

041106 **Recent progress on advanced transmission electron microscopy characterization for halide perovskite semiconductors**

[15 pages] Xiaomei Wu, Xiaoxing Ke, and Manling Sui

■ **ARTICLES**

- 042101 **DASP: Defect and Dopant ab-initio Simulation Package**
[14 pages] Menglin Huang, Zhengneng Zheng, Zhenxing Dai, Xinjing Guo, Shanshan Wang, Lilai Jiang, Jinchen Wei, and Shiyu Chen
- 042501 **Janus VXY monolayers with tunable large Berry curvature**
[10 pages] Wenrong Liu, Xinyang Li, Changwen Zhang, and Shishen Yan