

Preface to the Special Issue on Perovskite Semiconductor Optoelectronic Materials and Devices

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Halide perovskite, a novel semiconductor material, was initially used in solar cells since 2009, and tremendous progresses have been witnessed in the last decade. The power conversion efficiency of the single perovskite solar cells has been incredibly increased up to 25.2%, and close to 30% efficiency was realized in perovskite/silicon tandem solar cells. Recently, the application of perovskite has been extended to the light-emitting diodes and photo-detectors. Over than 20% external quantum efficiency of electroluminescence in green, red regions and close to 10% efficiency in blue were reported. Moreover it was very encouraged that the white emission based on new physical process were demonstrated. And very sensitive X-ray photo detector has been achieved by several groups. Furthermore, the perovskite memristors has been come true via the ion-migration character of this special material. In one word, halide perovskite is a new and also a wonderful semiconductor material, the optoelectronic devices performance based on this material are very amazing.

In this special issue, we organized topics focused on the perovskite optoelectronic materials and devices. We are grateful that 12 researchers who were invited to either summarize recent important progresses in typical areas or contribute their group progresses. Specifically, we have 5 reviews and 6 research articles, including in fundamental study of perovskite materials, solar cells, light-emitting diodes, photo-detector and also on memristors. In addition, we have a perspective on the image devices based on perovskite materials. All topics shown in this special issue are the main and/or future research directions in perovskite optoelectronic materials and devices. We sincerely hope that the researchers working in this hot area could benefit a lot from the published papers in this special issue. And we also welcome the authors working in this area could publish their high impact works in the *Journal of Semiconductors*.