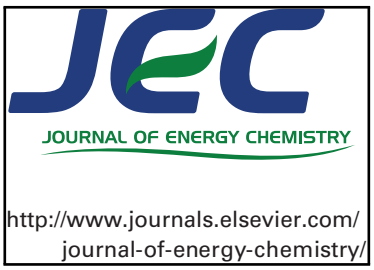

Nanocrystals of halide perovskite: Synthesis, properties, and applications

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Review

Nanocrystals of halide perovskite: Synthesis, properties, and applications

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Abstract

Recently, halide perovskite materials have become an exciting topic of research mainly due to their outstanding photovoltaic performance with the highest efficiency up to 22.1% at present. The nanocrystals (NCs) of these perovskites show quantum size effect, tunable bandgap, and excellent photoluminescence quantum yield (PLQY) in specific cases. Perovskite NCs have hence displayed great potentials in a broad range of applications, such as solar cells, light-emitting devices (LEDs), photodetectors, and lasers. In this review, we summarized the recent progress on the synthesis, optoelectronic properties and applications of the nanostructures of these halide perovskite materials, including hybrid organic-inorganic perovskites, pure inorganic perovskite, and perovskite-derived NCs. We have also provided a critical outlook into the challenges ahead.

Key words: Perovskite; Nanocrystals; Photoluminescence; Optoelectronic devices

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1. Introduction

In 1990s, Mitzi et al. [1] reported a series of organic-inorganic lead halide perovskite materials with high carrier mobility and studied their applicability in thin-film field-effect transistors (FETs). However,