Enhancing stability of perovskite materials for multimode applications

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Beyond the unprecedented success achieved in photovoltaics, lead halide perovskites (LHPs) have shown great potential in other optoelectronic devices. Among them, nanometer-scale perovskite quantum dots (PQDs) with fascinating optical properties including high brightness, tunable emission wavelength, high color purity, and high defect tolerance have been regarded as promising alternative down-conversion materials in phosphor-converted light-emitting diodes (pc-LEDs) for lighting and next-generation of display technology. Despite the tremendous success on applying perovskite materials in various fields, they have received numerous criticisms for the lack of stability. The poor stability has also attracted intense attention. Within a few years, numerous strategies towards enhancing the stability have been developed. In this report we will summarize the mechanism for intrinsic- and extrinsic-environment-induced decomposition of PQDs. Simultaneously, the strategies on improving the stability of PQDs are reviewed.

Short Bio:

Jun Lin received B. S. and M. S. degrees majored in inorganic chemistry from Jilin University, China in 1989 and 1992 respectively, and a Ph. D. degree from the Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, in 1995. He was then appointed as a research assistant/postdoc in Hong Kong (1996), Germany (1997-1998-2000). Since 2000 he has been working as a professor in CIAC, mainly focusing on luminescent materials for displays and lightening, as well as multifunctional materials as theragnostic agents for biomedical applications. He was selected in Thomson Reuters (Clarivate) Highly Cited Researchers in Materials Science and Cross-Field during 2014-2023. So far, he has published more than 900 peer-reviewed journal articles, such as **Chem. Rev.**、**Chem. Soc. Rev.**、**J. Am. Chem. Soc.**、**Adv. Mater.**、**Angew. Chem. Int. Ed**. etc. with over 70000 citations.