Cesium lead iodine perovskite solar cells

Can black phase cesium lead iodide perovskite be used for solar cells?
Black phase cesium lead iodide perovskite is regarded as a promising candidate for solar cells,but it easily transits to undesired yellow phase. Herein,Wang et al. stabilized the black phase using molecular additives to achieve device efficiency beyond 15% with high light soaking stability.

Which iodide is used for stable inorganic perovskite solar cells?
Marronnier,A. et al. Anharmonicity and disorder in the black phases of cesium lead iodideused for stable inorganic perovskite solar cells. ACS Nano 12,3477-3486 (2018). Sutton,R. J. et al. Cubic or Orthorhombic? Revealing the crystal structure of metastable black-phase CsPbI 3 by theory and experiment. ACS Energy Lett. 3,1787-1794 (2018).

Are all-inorganic cesium lead iodide perovskite solar cells stable?
All-inorganic cesium lead iodide perovskite solar cells with stabilized efficiency beyond 15%. Nat. Commun. 9, 1-8 (2018). Becker, P. et al. Low temperature synthesis of stable ?-CsPbI3 perovskite layers for solar cells obtained by high throughput experimentation. Adv. Energy Mater. 9, 1900555 (2019).

Are cesium lead halide perovskites stable for tandem solar cells?
Beal,R. E. et al. Cesium lead halide perovskites with improved stabilityfor tandem solar cells. J. Phys. Chem. Lett. 7,746-751 (2016). Schryver,S. &Lamichhane,A. Temperature-driven structural phase transitions in CsPbBr3. Solid State Commun. 371,115237 (2023).

Does chloride doping stabilize the perovskite phase of cesium lead iodide?
Natl Acad. Sci. USA 113,7717-7721 (2016). Dastidar,S. et al. High chloride doping levels stabilize the perovskite phase of cesium lead iodide. Nano Lett. 16,3563-3570 (2016). Kang,J. &Wang,L.-W. High defect tolerance in lead halide perovskite CsPbBr3. J. Phys. Chem. Lett. 8,489-493 (2017).

Are perovskite solar cells a good choice?
Although the materials with the best performance are currently organic-inorganic perovskites,the corresponding perovskite solar cells still suffer from low thermal stabilitiesdue to the volatile natures of the organic MA and FA-cation,which,in turn,had stimulated further research on inorganic LHPs.

It is found that the HI induces formation of hydrogen lead iodide (HPbI 3+x), an intermediate to the distorted black phase with appropriate band gap of 1.69 eV; while PEAI provides nucleation...

Our report of working inorganic perovskite solar cells paves the way for further developments likely to lead to much more thermally stable perovskite solar cells and other optoelectronic devices. The vast majority of perovskite solar cell research has focused on organic-inorganic lead trihalide perovskites.

Marronnier, A. et al. Anharmonicity and disorder in the black phases of cesium lead iodide used for stable inorganic perovskite solar cells. ACS Nano 12, 3477-3486 (2018).

Colloidal cesium lead iodide (CsPbI 3) perovskite quantum dots (QDs) are promising materials for solar cells because of their suitable optical bandgap and the ease of solution-based processing into large-area films.

An understanding of the interaction of water with perovskite is crucial in improving the structural stability of the perovskite. Hence, in this study, the structural and electronic properties of the ?-CsPbI3(220) perovskite surface upon the adsorption of water molecules have been investigated based on densit

Compared with organic-inorganic hybrid halide perovskites (OIHPs), inorganic cesium lead halide perovskites (CsPbX 3) possess superior intrinsic stability for high temperatures and are considered one of the most attractive research hotspots in the perovskite photovoltaic (PV) field in the past several years.

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Remarkable achievements have been made in the development of perovskite solar cells (PSCs) with a rapidly boosting rate of power conversion efficiencies (PCEs) from 3.8% to 26.1%. Nevertheless, the toxicity of lead (Pb) elements and the hygroscopicity of organic cations in high-efficiency PSCs severely hamper the commercialization of this technology. ...

Herein, we discussed the origin of phase stability for CsPbI 3 and the strategies used to stabilize the cubic (?) phase. We also assessed the CsPbI 3 black ?/? phases that are relatively stable at...

As the black cesium lead iodide (CsPbI3) tends to transit into a yellow ?-phase at ambient, it is imperative to develop a stabilized black phase for photovoltaic applications. Herein, we...

In particular, we discuss various strategies that have been proposed for increasing the efficiency and stability of perovskite materials and their corresponding solar cells; these include modifying the composition of lead-based and lead-free inorganic perovskites, solvent engineering, deposition techniques, and surface and interfacial passivation.

Lewis Acid-Base Adducts for Efficient and Stable Cesium-Based Lead Iodide-Rich Perovskite Solar Cells. Hui Lu, Hui Lu. Key Laboratory of Powder Material & Advanced Ceramics International Scientific & Technological Cooperation Base of Industrial Waste Recycling and Advanced Materials, Ningxia Research Center of Silicon Target and Silicon-Carbon ...

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