Perovskite battery ion migration

Why is ion migration important in perovskite solar cells?
Ion migration is a major issue hindering the long-term stabilityof perovskite solar cells (PSCs). As an intrinsic characteristic of metal halide perovskite materials,ion migration is closely related to the atomic arrangement and coordination,which are the basic characteristic differences among various facets.

Does photo-induced ion migration cause material instability and photocurrent hysteresis in perovskite solar cells?
Ion migration is a plausible originof material instability and photocurrent hysteresis in perovskite solar cells. Here,authors characterize photo-induced ion migration in perovskites by in situ laser illumination inside scanning electron microscope and observe long-range migration of halide ions.

Do cations affect perovskite materials and devices?
Previous research has predominantly focused on the migration of the halide ions. However,the migration of cations,which also has a significant influence on the device performance,is largely overlooked. In this Perspective,we review the migration of cations and their impacts on perovskite materials and devices.

Are metal halide perovskites susceptible to ion migration?
You have not visited any articles yet,Please visit some articles to see contents here. Metal halide perovskites exhibit remarkable properties for optoelectronic applications,yet their susceptibility to ion migrationposes challenges for device stability. Previous research has predominantly focused on the migration of the halide ions.

Does ion migration occur in complex perovskite material systems?
Although the migrating species,sources and pathways of ion migration have been studied to a certain extent,there is still a lack of clear understandingof the coupling mechanism among different ions migration under actual service conditions in complex perovskite material systems.

Why do perovskite devices fail?
As mentioned above,numerous studies have established that the instability of perovskite devices is due to ion migration. It had been demonstrated conclusively that ion migration can engender anomalous effects such as I-V hysteresis and phase segregation,ultimately resulting in the failure of solar cell devices.

Vashishtha, P. & Halpert, J. E. Field-driven ion migration and color instability in red-emitting mixed-halide perovskite nanocrystal light-emitting diodes. Chem. Mater. 29, 5965-5973 (2017).

An ultrathin Li-doped perovskite SEI film with high Li ion flux for a fast charging lithium metal ... (5.9 GPa), high lithium-ion migration number (0.57), and unique highly oriented ... the Li/LiFePO 4 battery using the Li-CsPbCl 3 SEI film showed an impressive cycling stability with a capacity retention rate of up to 91.4%

after 230 cycles ...

In this review, the current advances in investigating ion migration behavior in halide perovskite materials, covering the specific migrating species, involved characterization ...

Li, Z. et al. Extrinsic ion migration in perovskite solar cells. Energy Environ. Sci. 10, 1234-1242 (2017). Article CAS MATH Google Scholar ...

Here, we report a new passivation agent 4-aminotetrahydrothiopyran hydrochloride (4-ATpHCl) with multifunctional groups for the interface treatment of a 1.77-eV wide-bandgap perovskite film. 4-ATpH impeded halogen ion migration by anchoring on the perovskite surface, leading to the inhibition of phase segregation and thus the passivation of ...

a, Theoretical models of the iodide ion migration pathway in perovskite lattices without or with Nd 3+, Ca 2+ or Na + at the interstitial site. b, Relative energy landscapes of the system during ...

The migration of mobile ions has long been considered a source of performance degradation in devices based on halide perovskites, but details regarding the mechanisms and extent of this problem remain scarce. Here we report the ...

In perovskite devices, the electric field not only drives electrons but also leads to ion migration due to weak forces holding ions in the soft molecular lattice. However, the real-time visualization of electrically driven ion migration remains largely unexplored. To tackle this, Dou et al.1 fabricated diode 2D perovskite heterostructure to directly observe and harness ion ...

Hao, X. & Bartlett, B. Li 4 Ti 5 O 12 nanocrystals synthesized by carbon templating from solution precursors yield high performance thin film Li-ion battery electrodes. Adv. Energy Mater. 3, 753 ...

Dual-edged sword of ion migration in perovskite materials for simultaneous energy harvesting and storage application Ramesh Kumar, 1,2 3Monojit Bag, ... (PSC) with a solid-state lithium-ion battery (LIB), a flex-ible solid-state graphene-based supercapacitor, or a lithium-ion capacitor ...

The rapid development of electric vehicles calls for lithium-ion batteries with higher energy density and safety.1,2 The energy density of lithium-ion batteries is greatly limited by the lower capacity of the graphite anode (372 mA h g -1).Lithium metal anode has received widespread attention owing to its high capacity (3860 mA h g -1), light density and lowest ...

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