

About Halide Perovskite Fables, Facts and Wat's in-between.

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The metal, especially Pb halide perovskite literature contains numerous instances of “extraordinary” feature claims without critical comparison to well-known materials. We examine commonly cited attributes, e.g., very strong optical absorption, long diffusion lengths and lifetimes, solution processing, defect tolerance, to find which are unique and which are comparable to other materials. We put a dynamic lattice with strong anharmonicity central to HaPs’ behavior, underlying self-healing, leading to remarkable optoelectronic character, as well as to ion migration and interface instability. As such HaPs represent a remarkable class of materials whose distinctive lattice dynamics lead to what can manifest itself as a unique combination of properties. While possibly the uniqueness is not qualitative, it is so in terms of the quantitative aspects of the properties that constitute the combination. With such understanding the search for new materials, including quite different types, with HaP-like behavior can become feasible.