

Metal-free halide perovskites

Xin Song¹, Kui Zhao¹, Zhuo Xu,¹ Hagai Cohen², Shengzhong (Frank) Liu¹, Gary Hodes³

¹ School of Materials Science and Engineering, Shaanxi Normal University, Xi'an 710119, China.

² Department of Chemical Research Support, Weizmann Institute of Science, Rehovot 76100, Israel.

³ Dept. of Molecular Chemistry and Materials Science. Weizmann Institute of Science, Rehovot 76100, Israel.

Halide perovskites (HaPs) have, for most of the past decade, been intensively studied for their excellent optoelectronic properties with emphasis on PV cells and light emission. The most common members of this family have the general formula ABX_3 , where A is typically a monovalent cation (often organic as in alkyl amine but also inorganic), B is a divalent inorganic cation (with Pb^{2+} being the most common) and X a halide.

In 2002, metal-free HaPs were first reported where A is a large divalent amine cation and B is the ammonium cation [1]. The octahedral perovskite framework in these materials is believed to be held together by hydrogen bonding.

In this talk, I give a brief overview of these metal-free HaPs and our own work on single crystals of this interesting family with some emphasis on optical properties and XPS studies of their band structures.