**Intriguing effects on ion transport in organic-inorganic lead halide perovskites**

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 Organic-inorganic lead halide perovskites are considered very promising light-harvesting materials for photovoltaic. In spite of many studies, there is still a significant lack of understanding of the properties of materials and devices. In addition, these materials show many anomalous properties such as a huge low frequency dielectric constant and hysteretic I-V curves. Notably,unlike in conventional semiconductor, charge transport in these systems is not only electronic, but also ionic (*i.e.* due to mobile ionic species). This mixed ionic-electronic conduction can already explain the above anomalies. In order to understand the key features underlying the exceptional performances, not only electronic, but also ionic charge transport need to be considered.

In this talk will discuss several aspects related to ionic/electronic charge transport in lead halide perovskite. First, clear proofs of the bulk mixed conductivity will be given, focusing on [methylammonium](https://www.google.com/search?client=firefox-b-e&q=methylammonium&spell=1&sa=X&ved=0ahUKEwje9Z6rhNrhAhXNyqQKHerACWEQkeECCCooAA) lead iodide (MAPI). The dominant ionic and electronic charge carriers will also be identified. These are iodine vacancies and holes under dark equilibrium condition [2]. Secondly, the talk will discuss the unexpected finding that, in lead halide perovskites, light enhances not only electronic but also ionic conductivities by several orders of magnitude [3]. A mechanism for this effect will also be proposed, which impacts a material photo-stability. Finally, I will focus on interfaces, which are of great importance for devices. The application of novel approaches give indications of ionically-driven equilibrium space charge potential forming at interface between lead halide perovskite and oxide contacts [4,5]. The extensive study presents important implications for bulk charge transport, interfacial charge transfer, and stability of lead halide perovskite materials and devices.

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