2D Perovskite Optoelectronic and Solar Cell Research at the University of Sydney

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In the past decade, three-dimensional (3D) metal halide perovskites have been extensively researched for the next generation photovoltaic and opto-electronic devices. The recently emerged two-dimensional (2D) perovskites with better stability while retaining the same degree of versatility in terms of opto-electronic properties have opened up even more opportunities for diverse applications [1]. 3D perovskites have a crystal structure with the corner-sharing six-coordinated octahedra. A 2D or a quasi-2D perovskite involves the slicing of the 3D structure along the crystallographic plane resulting in a structure with layers of corner-sharing octahedra, separated by bulky spacer cations. Structures with a single layer of corner-sharing octahedra result in 2D perovskites while structures with multiple layers result in quasi-2D perovskites. The wide range of spacer choices means a large playing field for designing new types of 2D perovskites with difference phases such as the Ruddlesden–Popper (RP) phase; Dion–Jacobson (DJ) phase; or the alternating cations in the interlayer space (ACI) phase, as determined by the space size. I will talk about how we at the University of Sydney study the properties of layered perovskites for various which are then harnessed for optoelectronics and solar cell applications [2-5].

References

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