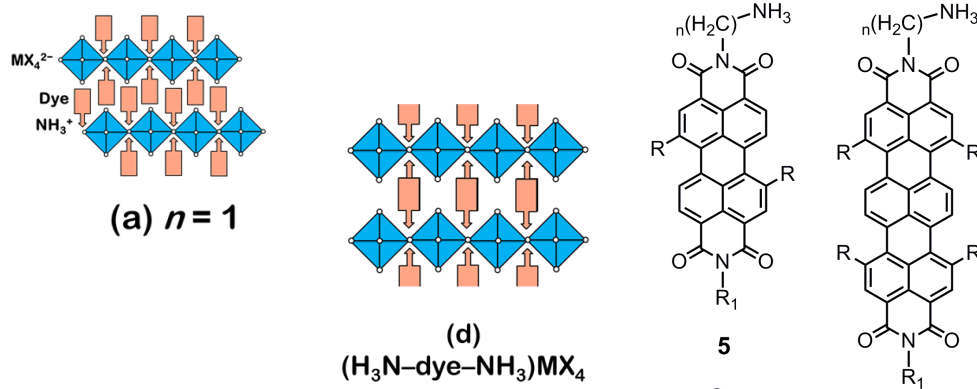


Designing functionality in 2D perovskites

2D perovskites are very interesting materials due to their improved moisture stability, intriguing optical properties and the high tunability of their chemical and physical properties. However, the organic compound in between the inorganic $[\text{PbI}_6]^{-1}$ octahedrals sheets does not play an active role in the charge carrier transport. In this project we aim to give functionality to the organic compound using strong acceptor or donor organic molecules. The use of p- or n-type dye can enhance charge separation in the hybrid material. An n-type dye will result in preferential electron conduction perpendicular to the inorganic planes. While hole transport will be restricted to these planes.

We have chosen to try to synthesize, for the first time, 2D perovskites using perylene diimides (PDI) organic molecules due to their excellent acceptor and singlet fission properties that enhance photon absorption potentially increasing the efficiency of solar cells. In this chemical synthesis project you would try to synthesize crystals and/or thin films and characterize them with techniques such as XRD, SEM, absorption and photo luminescent spectroscopy.



Literature

- Evans, H.A., et al. *Chem. Mater.* 2016, 28, 3607–3611
- Mitzi, D.B., et al. *Inorg. Chem.* 2002, 41 (8), 2134–2145.