# Lead halide perovskites for optoelectronic devices

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Lead halide perovskites belong to a group of materials with remarkable properties for photovoltaic and photodetective applications due to their unique optoelectronic features and much-needed simple and low-cost fabrication process. Their narrowband emissions and tunable color properties make them ideal for solar cells, light-emitting diodes (LEDs), or spectrometers with the working spectral range in the NIR-VIS-UV. On the other hand, the high atomic number of perovskites semiconductors broadens their utilization in the X-ray region. Despite tremendous progress in bulk perovskite-based devices, their environmental instabilities and potential structural defect formation during multiple bending operations discriminate them for use in flexible devices.

Here I will first demonstrate the advantageous strategies in enhancing the stability of perovskite solar cells (PSCs). Especially, methods for modification of electron and hole transport layers will be provided [1]. In addition, the effect of mechanochemical approach for the synthesis of perovskite absorber layer on the performance of the devices will be discussed [2,3]. Next, I will show the approaches for using lead halide perovskites in the form of single crystal as well as quantum dots for the photodetection applications. To improve the detector efficiency, the impact of the metal electrode, temperature and perovskite composition will be demonstrated.[4,5]

**References**

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