Metal halide perovskite single crystals for highly stable and efficient photovoltaic devices

Sang Hyuk Im[1*], Young-seok Kim[2], Woo-Sik Kim[3].
*lead presenter: imromy@korea.ac.kr
1 Korea University, Republic of Korea
2 Korea Electronics Technology Institute, Republic of Korea
3 Kyung Hee University, Republic of Korea

Since Kojima et al.[1] reported liquid junction metal halide perovskite sensitized photovoltaic devices, wealth studies have been done to commercialize the metal halide perovskite photovoltaic devices because the metal halide perovskites have unique properties such as high absorption coefficient, convenient bandgap tuneability, ambipolar carrier transportability, and solution processability. Although current record device efficiency reached over 25 %, the metal halide perovskite photovoltaic devices still have problem for commercialization due to poor reproducibility and long-term stability.
To solve these problems, many approaches such as A-site mixing, halide mixing, additive engineering, crystal cross-linking, and dimensional control have been done. However, it is not still satisfactory to find right solutions. In this regard, here, we would like to discuss how to solve these problems. As one of solutions, we tried to produce pure metal halide perovskite single crystals and checked their photovoltaic properties and stabilities.

References

[1] Kojima A et al. Organometal Halide Perovskites as Visible-Light Sensitizers for Photovoltaic Cells. J. Am. Chem. Soc. 2009:131:6050-6051.