Photoluminescence (PL) imaging of solar cells has the ability for inline quality evaluation and defect analysis. The PL image of solar cell can be used to analysis the uniformity distribution including material band gap, recombination coefficient, and defect distribution. The systematic defect might correlate to process tool and it is possible to be improved accordingly. Qualitative analysis of PL image for solar cell can help to determine the implied Voc distribution. The defect / shunting points can also be observed. The uniformity of Voc can help to analysis the power loss and further feedback to process optimization. The PL intensity can reveal the bulk, junction quality, and applied for reliability analysis (Figure 1). The shift of PL spectrum also indicates the change of radiactive recombination mechanism of perovskite thin film.

Figure 1: PL images of Perovskite Solar Cells