Extracting Contact Recombination from FFTfiltered Photoluminescence Imaging of Half-Metallised Si Solar Cells



Supplementary Information

Figure S1. PC3D simulated average image PL intensity as function of rear metal recombination (excess of J0,c-J0,TOPCon), for various baseline rear surface J0,TOPCon conditions.



Figure S2. PC3D breakdown of total recombination into bulk, front surface and rear surface components, as a function of illumination levels.



Figure S3. J0, TOPCon and J0, c results of additional sample groups

We attach here more results of using the FFT analysis on a variety of test sample groups.

The sample '1A' indicates it has TOPCon structure variation 1 and metal paste A. In this figure we have 6 sample groups with 4 different TOPCon structure variations and 2 metal pastes. The reported two groups (group 2A and 2B) in the draft have the same surface finish (with lowest surface J0, TOPCon levels among all groups) and only different in the metal paste applied.

PL images of sample groups with higher surface J0,TOPCon (worse surface passivation) are less bright under same imaging settings, the camera noise is worse in those dark images, which results in a high noise floor in k-space and less efficient signal subtraction/filtering. As a results, the J0,c estimation values for sample groups with higher base surface J0,TOPCon levels can subject to significant errors in group 1B and 3B.

It is for this reason that we use 2A and 2B (named paste A and B in the draft) to demonstrate how FFT method works. These sample groups are least influenced by k-space noise and are best suited for the FFT analysis.