

Designing the fabrication route for perovskite solar cells; from spin-coating to slot-die.

Trystan Watson, Jenny Baker, Joel Troughton, Francesca DeRossi, Simone Meroni, Katherine Hooper, Daniel Williams, James Durrant, Dave Worsley, Daniel Burkitt, Ben Smith, Peter Greenwood

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Abstract

This paper will introduce a brief overview of the challenges that must be overcome to unlock the industrial scale manufacture of perovskite solar cells. Whilst the photovoltaic performance of perovskite solar cells continues to increase, technology developments are also progressing in the area of printing and processing in order to realise large scale manufacture. Possible methods for both depositing the layer stack and its subsequent heating are numerous; to deliver a working and scalable device stack can require a hybrid approach where multiple techniques are employed.

The paper will focus on how to overcome the transition from laboratory scale spin coating equipment to factory type continuous slot-die or screen coating. In particular (i) how to achieve appropriate crystallisation dynamics of the perovskite layer by tuning the printing process, substrate temperature and post processing, (ii) how to ensure that an uncontrolled manufacturing environment (cleanliness, temperature and humidity) can still allow the deposition of an undamaged film and (iii) how to choose the right substrate, glass metal or plastic that is suitable for the appropriate application.

The talk will also provide a brief update on the overall activity within the Sêr Solar cluster.