

Impact of compositional tuning on the morphology and photovoltaic behaviour of perovskite solar cells

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Since the so-called perovskite fever started by 2012, the amount of reports about perovskite solar cells (PSC) has evolved exponentially pushing up the power conversion efficiencies over 20%. Perovskite materials have demonstrated their huge potential in PV due to their versatility and exceptional optical and electrical properties¹.

Although many efforts to tune the composition of perovskite precursor solution in order to vary their photovoltaic and electro-optical properties have been reported successfully², the interplay with morphology remains unclear. In Figure 1a and b SEM pictures (top view and cross sectional respectively) of the PSC prepared are shown, exhibiting an important homogeneity over large area and very big grains with few grains boundaries exposed. *J-V* response is included in Figure 1c. On the other hand, encapsulation of the devices has been demonstrated as an interesting approach to stabilize PSC³. The effect of encapsulation has been also studied here, presenting not very important efficiency losses which are driven principally by photocurrent drop.

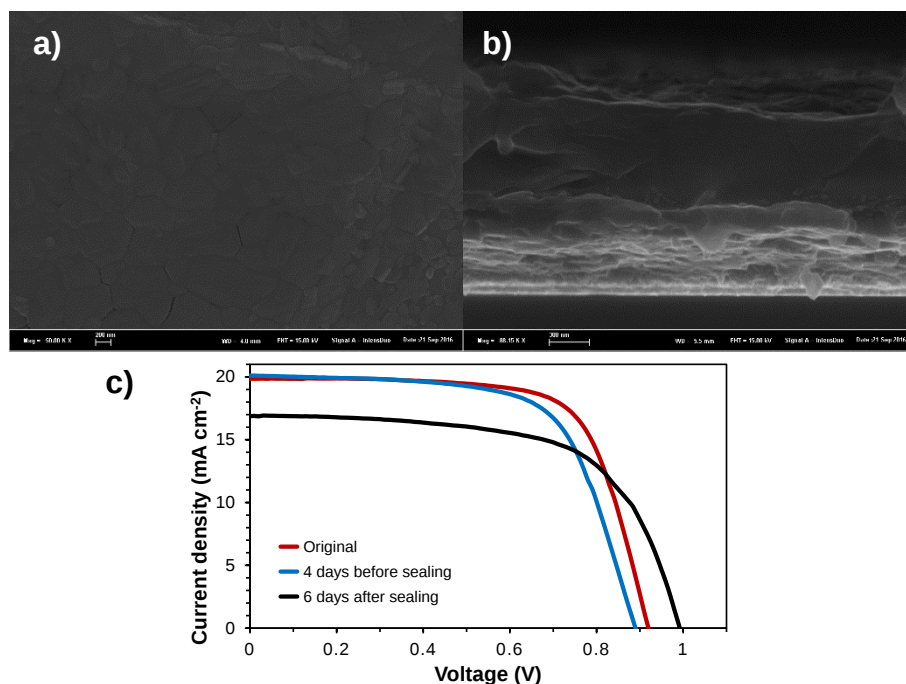


Figure 1. SEM examples of the PSC prepared **a)** top view and **b)** cross section. **c)** *J-V* characteristics of the PSC before and after sealing.

- 1 J. S. Manser, J. A. Christians and P. V. Kamat, *Chem. Rev.*, 2016, DOI: 10.1021/acs.chemrev.6b00136.
- 2 N. J. Jeon, J. H. Noh, W. S. Yang, Y. C. Kim, S. Ryu, J. Seo and S. Il Seok, *Nature*, 2015, **517**, 476–480.
- 3 F. J. Ramos, D. Cortes, A. Aguirre, F. J. Castano and S. Ahmad, *IEEE 40th PVSC*, 2014, 2584–2587.