A facile synthesis of a thiophene-based molecule as hole transporting material in mixed cation-based perovskite solar cells

Laura Calio'*†[1], Manuel Salado Manzorro[1], Samrana Kazim[1], and Shahzada Ahmad[1]

[1]Abengoa Research – Calle Energía Solar, 1 41014, Spain

Abstract

Recently the progress in the application of hybrid organic-inorganic perovskite as a light-absorber in solar cells has raised the power conversion efficiency from 3.8% to over 22% in few years, making these cells as spearhead in thin film PV technology. This unprecedented increase in PCE of perovskites based solar cells motivated researchers to optimize the materials, the architectures and layers configurations, in order to improve further the photovoltaic properties. In all these architectures Spiro-OMeTAD remains the best material used in Hole Transporting Layer as electron blocking and p-type material. However, Spiro-OMeTAD is too expensive due to its multistep synthetic route and complex purification, which raises its commercial price. Moreover, it doesn't performs good in its pristine form, so it needs a p-type additives in order to enhance hole mobility and conductivity. Recently researchers are focusing in the design of novel small organic molecules as cheaper and efficient Hole Transporting Materials (HTMs). Here we present an easy-to-be-synthetized thiophene-based molecule that has been used as HTM in mixed cation perovskite-based solar cell and that shows encouraging results in order to achieve efficient and commercial accessible devices.

*Speaker

†Corresponding author: laura.calio@abengoa.com