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Rapid evaluation of different Perovskite absorber layers through the application of depth profile analysis using Glow Discharge - Time of Flight Mass Spectrometry

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ABSTRACT

Depth profile analysis of perovskite absorber layers deposited onto glass substrates is investigated by radiofrequency pulsed glow discharge - time of flight mass spectrometry (rf-PGD-ToFMS). Elemental depth profiles obtained for perovskite films fabricated using a double-step deposition route with different precursors (methylammonium iodide and PbI_2 , PbCl_2 or PbBr_2) show varying distribution of the principle components depending on the precursors employed. Furthermore, the results show that rf-PGD-ToFMS allows to identify traces of residue solvent used in the initial film preparation (dimethyl sulphoxide or dimethylformamide) and to identify differences produced by film thickness and oxygen uptake caused by exposure to ambient conditions. The approach also enables inspection of the differences in elemental diffusion and the degradation processes. By using rf-PGD-ToFMS, no ultra-high-vacuum is needed for processing and rapid analysis of absorber films can be

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