

Influence of the conductive material type on the performance of inverted perovskite solar cells



Joana Príncipe

jprincipe@fe.up.pt

Supervisor: Luísa Andrade^{1,2}

1. ALiCE – Associate Laboratory in Chemical Engineering, Faculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465, Porto, Portugal

2. LEPABE – Laboratory for Process Engineering, Environment, Biotechnology and Energy, Faculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465, Porto, Portugal

MIT Portugal
2022 Annual Conference

Inverted Perovskite Solar Cell



assembled on top of a

INTRODUCTION

Glass substrate with a Transparent Conductive Oxide (TCO)

Indium Tin Oxide (ITO)

Fluorine Tin Oxide (FTO)

In inverted perovskite solar cells (PSCs), ITO is the widely used conductive material. Nevertheless, indium is a rare metal and the ITO price is higher than FTO.

So, why this type of TCO is still being the preferred one? Does it yield better performance results?

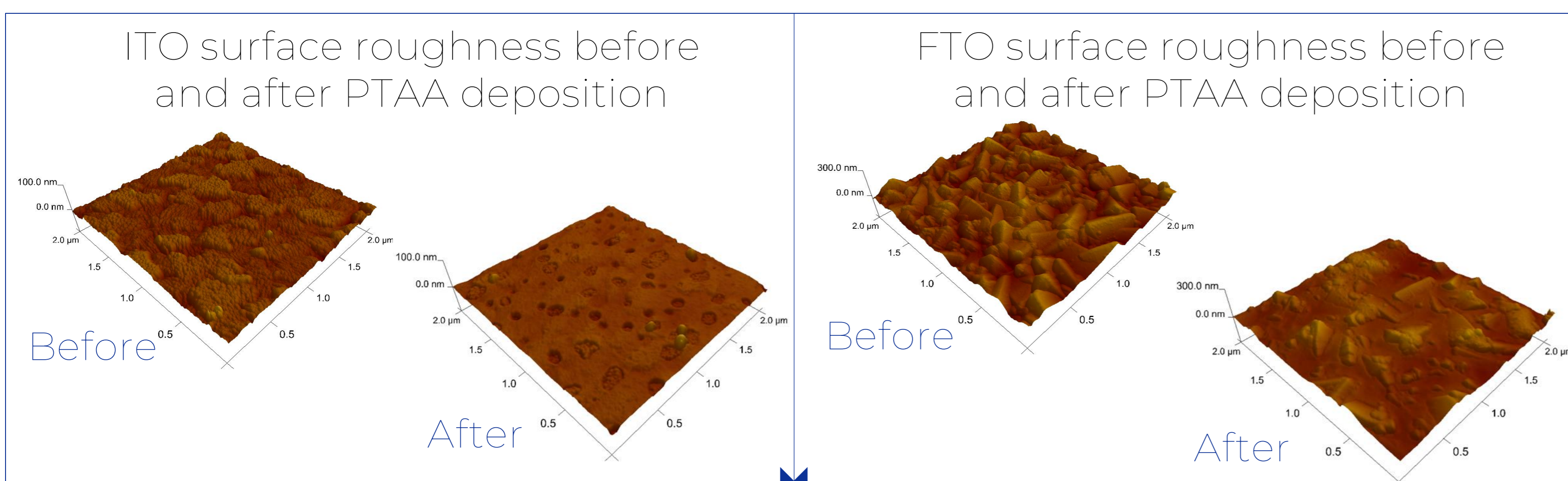
METHODOLOGY AND MATERIALS

Inverted PSCs with an active area of 0.2 cm² were produced using spin-coating method.

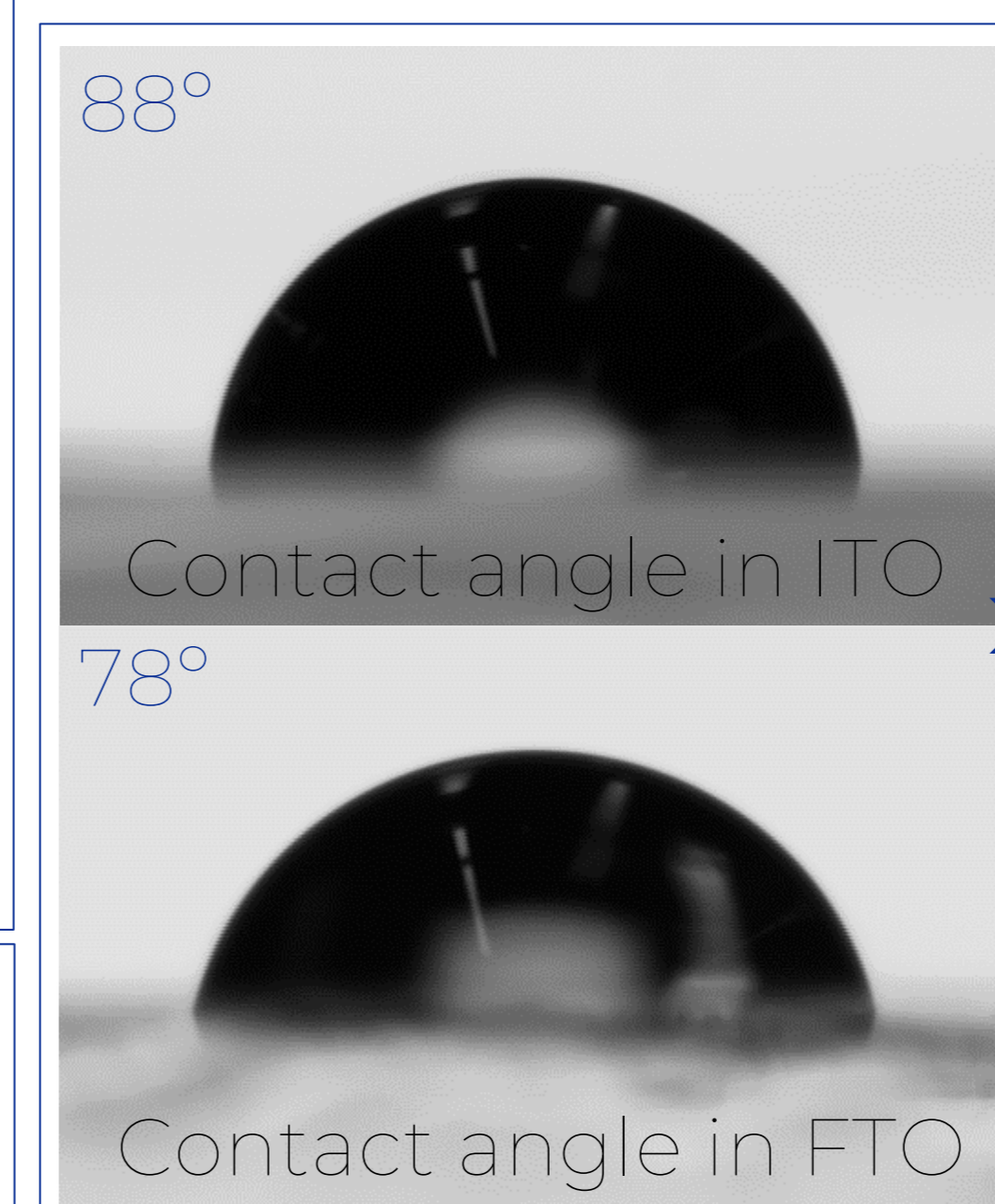
PSC architecture



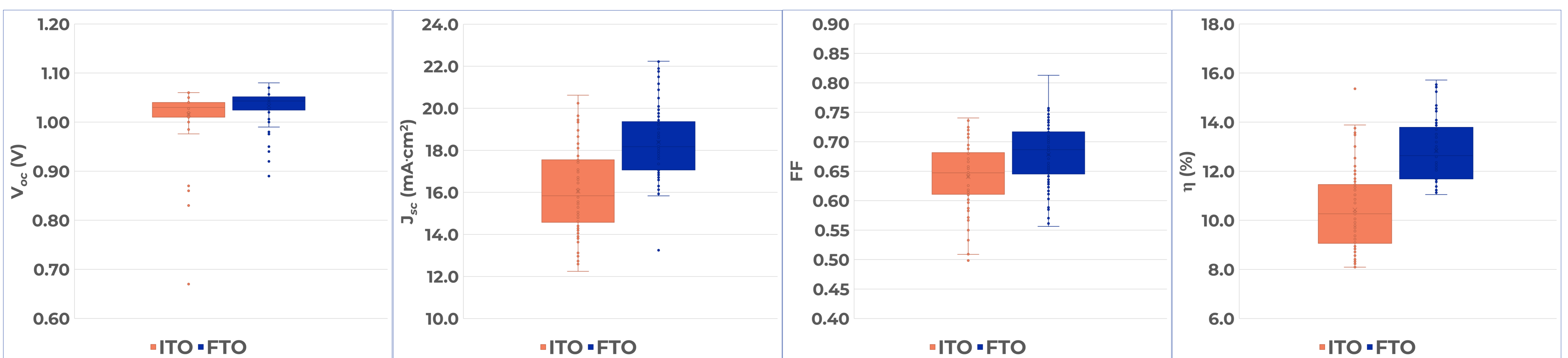
RESULTS AND CONCLUSIONS



Despite the surface roughness of FTO being higher than ITO, the PTAA and PEAI layers will diminish this difference and result in a smoother surface for perovskite film deposition.



A smaller contact angle indicates better adhesion of the perovskite film to the substrate.



Conclusion: In addition to the economic advantages of using FTO substrates, the use of this substrate results in solar devices with better performance.

This work was financially supported by: Base Funding - UIDB/00511/2020 of the Laboratory for Process Engineering, Environment, Biotechnology and Energy - LEPABE - funded by national funds through the FCT/MCTES (PIDDAC); Project InPSC - PTDC/QUE - EQU/4193/2021, funded by FEDER funds through COMPETE2020 - Programa Operacional Competitividade e Internacionalização (POCI) and by national funds (PIDDAC) through FCT/MCTES.



Funded by:



under the Doctoral Grant PRT/BD/152838/2021 | Sustainable Cities