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## Solar Energy Materials and Solar Cells

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# Fully roll-to-roll prepared organic solar cells in normal geometry with a sputter-coated aluminium top-electrode

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### Highlights

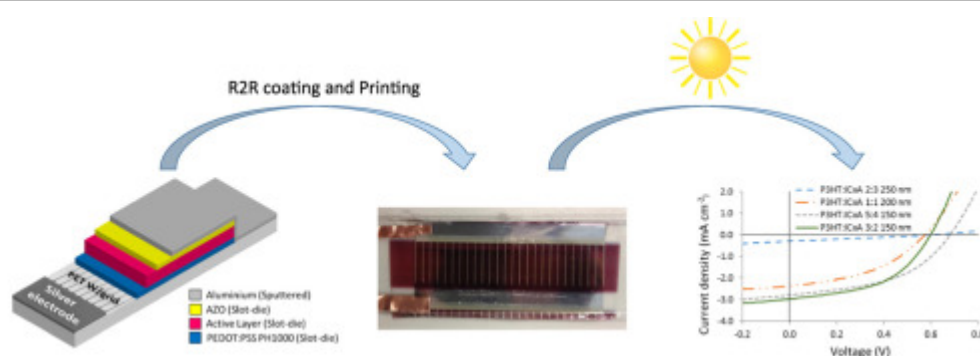
- Fully roll-to-roll prepared organic solar cells with normal geometry.
- Engineering of buffer layers allowed sputter coating of aluminium top-electrode.
- Low cost fullerene blend utilized as acceptor in the active layer.
- Active layer optimizations resulted in devices with higher performance.

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## Abstract

We demonstrate a pathway for fully roll-to-roll (R2R) prepared organic solar cells in a normal geometry with a R2R sputtered aluminium top electrode. Initial attempts utilizing a stack geometry without an electron transport layer (ETL) failed to obtain working devices. By applying aluminium zinc oxide (AZO) as an ETL, and optimizing the AZO thickness, working printed OPV devices with an efficiency of 0.58% were obtained. Further optimization of the donor:acceptor ratio in the active layer increased the efficiency to 0.90%. This work demonstrates that normal geometry organic solar cells using a metal top contact can be produced using large scale production techniques.

## Graphical abstract



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## Keywords

Roll-to-roll processing; Sputter coating; Normal geometry; Organic photovoltaics; Printing

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