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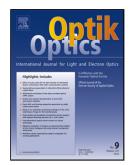
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Investigation of the Influence of Different Hole-Transporting Materials on the

**Performance of Perovskite Solar Cells** 

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**Abstract:** 

The use of polymer layers as hole transport materials has been recomended to amlify the

resistance to degradation of methylammonium perovskite solar cells. Polymeric materials have

been investigated but with little achievement as they lead to a lower conversion efficiency than

the values attained using Spiro-OMETAD. In this paper, perovskite solar cells are reported to

have been numerically simulated using SCAPS-1D and AMPS-1D. It is a study of the influence

of thickness of absorbers and hole transporting materials (HTM) as well as holes density and

temperatur on short-circuit current density (Jsc), open-circuit voltage (Voc), fill factor and

efficiency. Also, J-V characteristics and quantum efficiency are calculated in five types of HTMs

(i.e. Spiro-OMETAD, PEDOT PSS, NPB, MEH-PPV, P3HT) and without an HTM layer. There

is an improvement observed in the solar cell efficiency as compared to the standard Spiro-

MeOTAD buffer based on solar cell configuration. The observation suggests the possibility of

using PEDOTPSS for HTM conversion efficiency, and, thus, a replacement is found for the

expensive and moisture-sensitive Spiro-OMETAD.

**Keywords:** Perovskite solar cells, Polymeric materials, Device simulation, Buffer layes

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