# Small Molecular Hole-Transport Materials with Polycyclic Aromatic Hydrocarbons for Perovskite Solar Cells

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The hole transport material plays a pivotal role in advancing high-performance perovskite solar cells.[1] In these devices, it not only facilitates the collection and transport of holes to the electrodes but also significantly contributes to the device's stability. In recent years, our laboratory has focused on designing novel polycyclic aromatic hydrocarbon molecules. Starting with anthracene, we synthesized dihydrodinaphthopentacene and dihydronaphtho[1,2,3,4-rst]pentaphene derivatives. The planar and rigid structures of polycyclic aromatic hydrocarbons promote π-π interactions between molecules, enhancing hole mobility. When utilized as hole transport materials in perovskite solar cell components, these molecules demonstrate excellent performance, highlighting their potential application in advancing efficient perovskite solar cells.

Additionally, employing a hybrid hole transport material (HTM) that combines spiro-OMeTAD with a newly synthesized benzo[g]quinoxaline-based organic small molecule presents a simple yet effective strategy to improve the efficiency and stability of perovskite solar cells. When blended with spiro-OMeTAD, these compounds improve the performance of PSCs, as well as enhance film morphology and charge transport.

**References**

[1] Kim, J. Y.; Lee, J.-W.; Jung, H. S.; Shin, H.; Park, N.-G. High-Efficiency Perovskite Solar Cells. *Chem. Rev.* **2020**, *120*, 7867-7918.