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New AzaphenazeneDerivative and its Use as Semiconductor in Inverted Hybrid Perovskite Solar Cells.

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Abstract:

Organic electronics is a research area emerged in the last couple of years, and coversfrom the molecular design, as well as structural, optical and electroniccharacterisation, to the fabrication and optimization of the corresponding optoelectronic device.Moreover, these materials couldbe incorporated as organic semiconductors into devices such as organic light-emitting diodes (OLEDs)[1], organic field-effect transistors (OFETs)[2] and organic solar cells (OSCs)[3], to mention some of them. Unfortunately, one of the main disadvantages that present organic semiconductors is the disorder inherent to their solid-state structure, unlike inorganic semiconductors, since they present a highly ordered solid-state structure.As a consequence, this disorder affects negatively to the charge transport process, however, it's possible to improve the arrangement at the solid-state by a self-assembly process.

To achieve this purpose, we employ hydrogen-bonding interactions[4], since they are considered one of the strongest non-covalent interactions and they also possess directionality and cooperativity so, we could induce an spontaneous order at the solid-state by self-assembly and, therefore, charge transport will be benefited.

Thus, we carried out the synthesis and characterisation of a new azaphenazene system which incorporates donor and acceptor hydrogen-bonding centers and, in addition, we studied its behavior as organic semiconductor in a perovskite solar cell.

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