**Interfacial Engineering of Carbon Electrodes for Efficient and Stable Perovskite Solar Cells**

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Perovskite based solar cells have attracted great attention over the past decade due to their extraordinary light-harvesting characteristics. The efficiencies of perovskite solar cells (PSCs) have increased from 3.8% in 2009 to 25.2% in 2019,[1,2] making it the fastest‐advancing photovoltaic technology. However, the key challenges restricting its commercialization include poor stability and high manufacturing cost, both caused by the use of Spiro-OMeTAD and gold (Au) as hole transporting material (HTM) and conducting electrode, respectively.[3,4] Carbon electrode based PSCs without HTMs and Au electrode are regarded as a promising alternative architecture to realize stable and low-cost PSCs.[5] Notably, the carbon electrode materials are now commercially available in the market. Despite their great promise, this class of solar cells fabricated using commercial carbons suffer from limited device efficiency due mainly to the poor hole selectivity and imperfect interface between carbon and perovskite layers. Therefore, developing a new class of carbon electrode materials is required with a great sense of urgency. In this work, after highlighting significant advances that have been made in carbon electrode based PSCs, we present our contribution to this cutting-edge research field. We aim to design a novel type of functional carbon electrodes using interfacial engineering, chemical modification and also integrating emerging two-dimensional (2D) materials.

**References**

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