Low-cost electrocatalysts for emerging solar cells

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Recently, a vast amount of research has been carried out to develop highly efficient and low-cost emerging solar cells including dye-sensitized solar cells (DSSCs), quantum dot solar cells, and perovskite solar cells. In general, these emerging solar cells require high-cost electrocatalysts or organic hole conductors for the efficient hole transport, such as Pt electrocatalyst and spiro-OMeTAD. However, for the commercialization of the emerging solar cells, it is needed to develop low-cost and efficient electrocatalysts. This presentation will discuss the development of low-cost electrocatalysts for the emerging solar cells. In particular, carbon-based materials, metal sulfide or nitride materials (MoS2, NiN, CoN, etc.) have been prepared using various synthetic processes. These materials were effectively applied in emerging solar cells as an electrocatalyst or hole-transport material. The electrocatalytic and photovoltaic properties of these materials will be discussed.