

Sunlight-Activated Graphene Heterostructure Transparent Cathodes for High-Performance Graphene/Si Schottky Junction Photovoltaics

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Abstract : This work demonstrated a “sunlight-activated” graphene-heterostructure transparent electrode in which photogenerated charges from a light-absorbing material are transferred to graphene, resulting in the modulation of electrical properties of the graphene transparent electrode caused by a strong light-matter interaction at graphene-heterostructure interfaces. A photoactive graphene/TiO_x-heterostructure transparent cathode was used to fabricate an n-graphene/p-Si Schottky junction solar cell, achieving a record-high power conversion efficiency (>10%). The photoactive graphene-heterostructure transparent electrode, which exhibits excellent tunable electrical properties under sunlight illumination, has great potential for use in the future development of graphene-based photovoltaics and optoelectronics.

Keywords : graphene, transparent electrode, graphene/Si Schottky junction, solar cells

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