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Graphene/Si solar cells employing triethylenetetramine dopant and polymethylmethacrylate antireflection layer

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Highlights

- We first employ triethylenetetramine as a dopant of graphene transparent conducting electrodes for Si heterojunction solar cells.
- Maximum power-conversion efficiency of 4.32 % is obtained at a doping concentration of 0.2 mM.
- Long-term stabilities of the photovoltaic properties are greatly improved by the use of the graphene electrodes.
- PMMA is employed as an antireflection layer to enhance the light-trapping effect on the solar cells, resulting in further enhancement of the maximum efficiency to 5.48 %.

ABSTRACT

We report the use of triethylenetetramine (TETA) as a dopant of graphene transparent conducting electrodes (TCEs) for Si heterojunction solar cells. The molar concentration (n_D) of TETA is varied from 0.05 to 0.3 mM to optimize the graphene TCEs. The TETA-doped