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Facile synthesis of graphene quantum dots from corn powder and their application as down conversion effect in quantum dot-dye-sensitized solar cell

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Abstract

Graphene quantum dots are interesting materials that are currently attracting world-wide scientific and technological interest because of their unique optical properties. In this research, graphene quantum dots were prepared from corn powder and were applied in DSSCs as down conversion materials. These prepared graphene quantum dots convert UV light to 450 and 520 nm light which favourable for DSSCs. Modified solar cell based on graphene quantum dots shows 21 % enhancement in J_{SC} compare to the reference cell. EIS, IMPS and IMVS have used to approve that this enhancement is because of down conversion effect of graphene quantum dots. The results of our study offer a novel down conversion material which have many advantages compare to the previous reports. This results could be used in other photovoltaic systems.

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