



Solar Energy

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Review

Potential of producing solar grade silicon nanoparticles from selected agro-wastes: A review

J.A. Adebisi ^{a, b} ✉, J.O. Agunsoye ^a, S.A. Bello ^c, I.I. Ahmed ^b, O.A. Ojo ^{a, d}, S.B. Hassan ^a

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Highlights

- Nigeria electricity generation is below the actual demand estimated at 10,000 MW.
- Total energy consumption is fossil fuels based with greenhouse gases emission.
- Solar PV can provide clean, sustainable and easily accessible electricity.
- Agricultural wastes can be converted to solar grade silicon at low cost.
- Thin film PV modules can be fabricated to improve Nigeria energy profile and GDP.

Abstract

The U.S. Energy Information Administration (EIA) stated that Nigeria generates around 3080 MW of electricity but with actual estimated demand of 10,000 MW. Due to the low electricity generation, total energy consumption profile of Nigeria showed that about 99% of the energy consumed is derived from fossil fuels which invariably contribute to greenhouse gases emission. Electricity, if readily available at low cost, can easily replace the fossil fuels which pose adverse effect on the citizen and climate. Solar photovoltaic is identified as an effective renewable energy source that has proven to be a promising candidate for provision of clean and sustainable electricity. Silicon is the leading commercialized terrestrial PV material for making solar cell due to its relative efficiency. This review work highlights the viability of using abundant agricultural wastes in Nigeria to

silicon (nanoparticles) synthesized from agricultural wastes are dissected. Production of silicon nanoparticles from this origin could provide low cost solar grade silicon compared with high temperature robust methods currently been used to obtain them. Hence various methods of producing nanoparticles are highlighted.

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Keywords

Silicon; Agricultural wastes; Nanoparticles; Photovoltaic materials; Energy

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