Abstract

Fabrication of semiconductors using SNPs synthesized from SiO_2 extracted from agricultural waste

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Silicon being the most common element used for the direct conversion of solar energy into electrical energy, solar cells have, over the years, been the corresponding technology to the problem of energy on our planet. This technology is most common in aerospace applications. Nonetheless, the application in terrestrial areas is currently hindered by the high cost of photovoltaic modules. Therefore, the study focuses on the extraction and synthesis of silicon nanostructures from sugarcane bagasse ash. Particularly, silicon is found in this feedstock in the form of silicic acid and predominantly as silica. The study's main goal could be achieved through the sustainable extraction of silica from sugarcane bagasse ash and subsequent transformation into nanostructured silicon.

The interesting properties of photovoltaic technology have fuelled the need for a transition from fossil fuel-based energy sources. Therefore, the energy produced from photovoltaics is technologically feasible (economically viable), environmentally benign, sustainable, and socially equitable. A typical silicon solar cell was inspired for this study, whereby it consists primarily of n-type and p-type layers, and rear contact as metallic silver (Ag). The anode was the ITO coated glass substrates which can be a dual layer as transparent conductive oxide (TCO) layer and hole transporting layer while the back contact was Ag. Metallic silver was chosen because it does not diffuse easily on the positive layer to avoid creating heavily doped positive layer. Ever since, the team is been working on improving the efficiency of the solar cells.

References

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