

Stannate materials for solar energy applications

Eze, CN; **Obodo**, RM; Kebede, Mesfin A and Ezema, FI

Abstract:

Alkaline earth stannates are rare earth compounds with evidence of their attractive physical properties. Commonly, these rare earth complex oxide nanomaterials could be fabricated via conventional solid-state reactions such as coprecipitation, sol gel, hydrothermal, self-propagation techniques, etc. For these stannates to be better utilized in solar energy harvesting applications, they are better doped. The stannates considered here are SrSnO_3 , BaSnO_3 , and ZnSnO_4 . The doped stannates are used in various ways as stated above and equally as transparent conductors, light absorbers, photoanodes, etc. This is in relation to optical properties. The optical properties, structural order, and surface properties of these materials are considered. On doping, these stannates maintain excellent transparency, which makes them excellent materials as transparent conductor, particularly ZnSnO_4 . They are found highly useful in photocatalysis and other areas. In solar energy harvesting, solar energy harvesting devices could have a better output when nanostructures like doped stannates are incorporated in them. Such advance is hopeful. It improves the power conversion efficiencies (PCE) of such devices by utilizing new nanostructures to update device structural designs. This is an applauded process.