

Morphological and optical characterization of TiO₂/SiO₂ thin films

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Metal-dielectric composites (known as cermets) have been intensively studied in the last decades as solar absorbers. Several cermets have been produced commercially, having high absorbance of incident solar radiation and minimum emittance of infrared thermal radiation. The present work presents morphological and optical characterization of TiO₂/SiO₂ thin films deposited on glass, aluminium, silicon and copper substrates using the electron beam evaporation technique. Their structural and optical properties have been investigated using the Atomic Force Microscopy (AFM), scanning electron microscope (SEM) and Optical Spectroscopy (UV-Vis and FTIR). The results demonstrate promising solar spectrally selective behavior indicating the composite as an excellent choice for solar thermal applications.

Keywords: Electron beam evaporation, solar energy, AFM, SEM.

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- [1] J.P. Barnes et al., *Nanotechnology* 13 (2002) 465.
 - [2] R. Joerger et al., *Sol. Energy Mater. Sol. Cells* 54 (1998) 351.
 - [3] J.H. Schön et al., *Sol. Energy Mater. Sol. Cells* 33 (1994) 403.
 - [4] G.A. Niklasson et al., *J. Mater. Sci.* 18 (1983) 3475.
 - [5] G.E. McDonald, *Sol. Energy* 17 (1975) 119.
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