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Nanostructure Antireflective Sol-Gel Silica Coatings for Solar Collectors

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Abstract : Sol-gel technology is a promising manufacturing method to produce anti reflective silica thin films for solar energy applications. So to improve the properties of the films, controlling parameter of the sol - gel method is very important. In this study, soaking treatment effect on optical properties of silica anti reflective thin films was investigated. UV-Visible Spectroscopy, Fourier-Transformed Infrared Spectrophotometer and Field Emission Scanning Electron Microscopy was used for the characterization of silica thin films. Results showed that all nanoporous silica layers cause to considerable reduction of light reflections compared with uncoated glasses. With single layer deposition, the amount of reduction depends on the dipping time of coating and has an optimal time. Also, it was found that solar transmittance increased from 91.5% for the bare slide up to 97.5% for the best made sample corresponding to two deposition cycles.

Keywords : sol–gel, silica thin films, anti reflective coatings, optical properties, soaking treatment
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