

Influence of TEOS Concentration and Triton Additive on the Nanostructured Silica Sol-Gel Antireflective Coatings

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Abstract : Nanostructure silica antireflective surfaces were fabricated on glasses by Sol-Gel technique. Various silica sols (varying in composition: tetraethyl orthosilicate (TEOS) concentration and Triton additive) were synthesized by the polymeric process and then subsequently coated on substrates. Silica thin films were investigated by using UV-Visible Spectroscopy; Fourier-Transformed Infrared Spectrophotometer and Field Emission Scanning Electron Microscopy were used. Results indicated that dense silica layers, obtained from the polymeric method, permit a considerable reduction of these light reflections compared with uncoated glasses in all the cases studied, but the degree of reduction is different depending on the composition of the precursor solution. It was found that the transmittance increased from 0.915 for the bare slide up to 0.96 for the best made sample corresponding to the Triton-doped silica. The addition of Triton x-100 to the silica sols improved the optical property of thin film because of it helps to create nanoporous in the coating. Also the results showed SiO₂ content is an effective parameter to prepare the antireflective films. Loss of SiO₂ cause to rapid the reactions and Si-O-Si bonding form better under this condition.

Keywords : sol-gel, silica thin films, antireflective coatings, optical properties, triton

Conference Title : ICMTM 2015 : International Conference on Metallurgy Technology and Materials

Conference Location : Berlin, Germany

Conference Dates : May 21-22, 2015