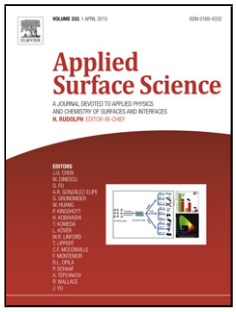
Accepted Manuscript



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PII: S0169-4332(15)00659-5
DOI: http://dx.doi.org/doi:10.1016/j.apsusc.2015.03.074
Reference: APSUSC 29951

To appear in: *APSUSC*

Received date: 2-12-2014
Revised date: 12-3-2015
Accepted date: 13-3-2015

Please cite this article as: R.P. Chahal, S. Mahendia, A.K. Tomar, S. Kumar, UV Irradiated PVA-Ag nanocomposites for optical applications, *Applied Surface Science* (2015), http://dx.doi.org/10.1016/j.apsusc.2015.03.074

UV Irradiated PVA-Ag nanocomposites for optical applications

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Abstract

The present paper is focused on the in-situ prepared Poly (vinyl alcohol)-Silver (PVA-Ag) nanocomposites and tailoring their optical properties by means of UV irradiation in such a way that these can be used for anti-reflective coatings and bandpass filters. The reflectance from these irradiated nanocomposites has been found to decrease leading to the increase in refractive index (RI), with increasing UV exposure time, in the entire visible region. Decrease in optical energy gap of PVA film from 4.92 eV to 4.57 eV on doping with Ag nanoparticles has been observed which reduces further to 4.1 eV on exposure to UV radiations for 300 minutes. This decrease in optical energy gap can be correlated to the formation of charge transfer complexes within the base polymer network on embedding Ag nanoparticles, which further enhances with increasing exposure time. Such complexes may also be responsible for increased molecular density of the composite films which corresponds to decrease in reflectance corroborating the observed results.

Keywords: UV Irradiation, optical energy gap, refractive index, anti-reflection coating

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