Electronic Supplementary Material (ESI) for RSC Advances.

SUPPORTING INFORMATION

Polarization dependent diffraction from anisotropic oblique columnar Ag thin films grown on DVD grating templates

*Pratibha Goel, Kalpana Singh, J. P. Singh**

Department of Physics, Indian Institute of Technology Delhi, Hauz Khas, New Delhi-110016, India

E-mail: jpsingh@physics.iitd.ac.in

Polycarbonate Grating construction: The grating used in this work was prepared from commercial DVD-R. The DVD-R consist of two 0.6 mm thick polycarbonate surface that sandwich a reflective layer and dye layer between them. DVD-R was manually split into constituent polycarbonate pieces at the center by surgical blade. The polycarbonate piece consisting grooves is easily distinguished from the unstructured piece as it exhibits a "rainbow" of diffracted light and a blue tint due to dye layer, which were then immersed into ethanol to remove the dye layer on the grating side followed by drying with the steam of nitrogen. The Fig. S1 shows the steps for the formation of the grooved polycarbonate substrate.

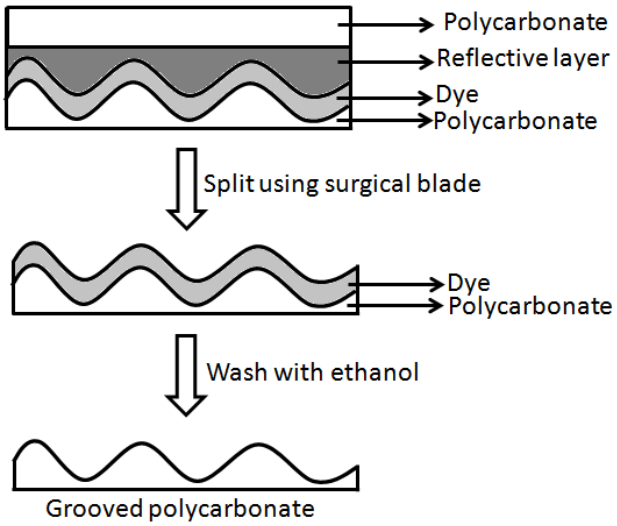

Fig. S1: Schematic showing the construction of grooved polycarbonate DVD grating substrate.

XRD Spectrum of Ag nanorods: The X-ray diffraction spectrum was recorded using glancing angle X-ray diffraction (GAXRD, Cu K_α radiation of wavelength 1.54 Å, Phillips X'pert PRO-PW 3040). The XRD spectrum of Ag nanorods arrays sample is shown in Fig. S2.

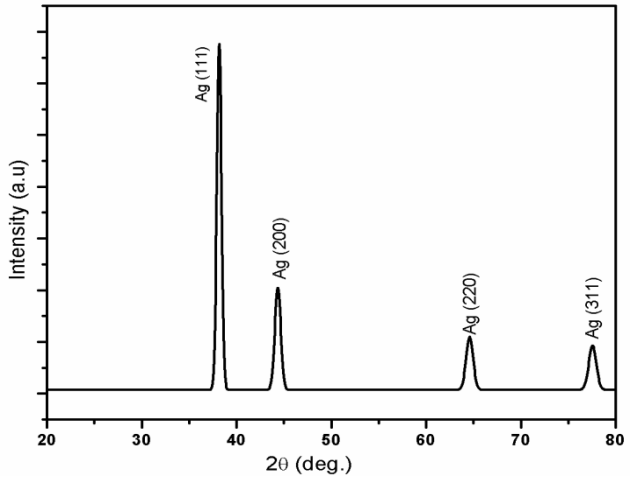

Fig. S2: XRD plot of the sample having film thickness value d = 185 nm.

The XRD plot shows the most intense peak of Ag(111). The Ag nanorods on DVD are stable against oxidation.

Calibration of pixel into wavelength: In the present work each diffraction image is first converted into line profile (transmittance versus distance (pixels)) using various filters. The resulting peak intensity position of the various colors is calibrated by linear fitting resulting into a line profile indicating transmittance versus wavelength as shown in Fig. S3.

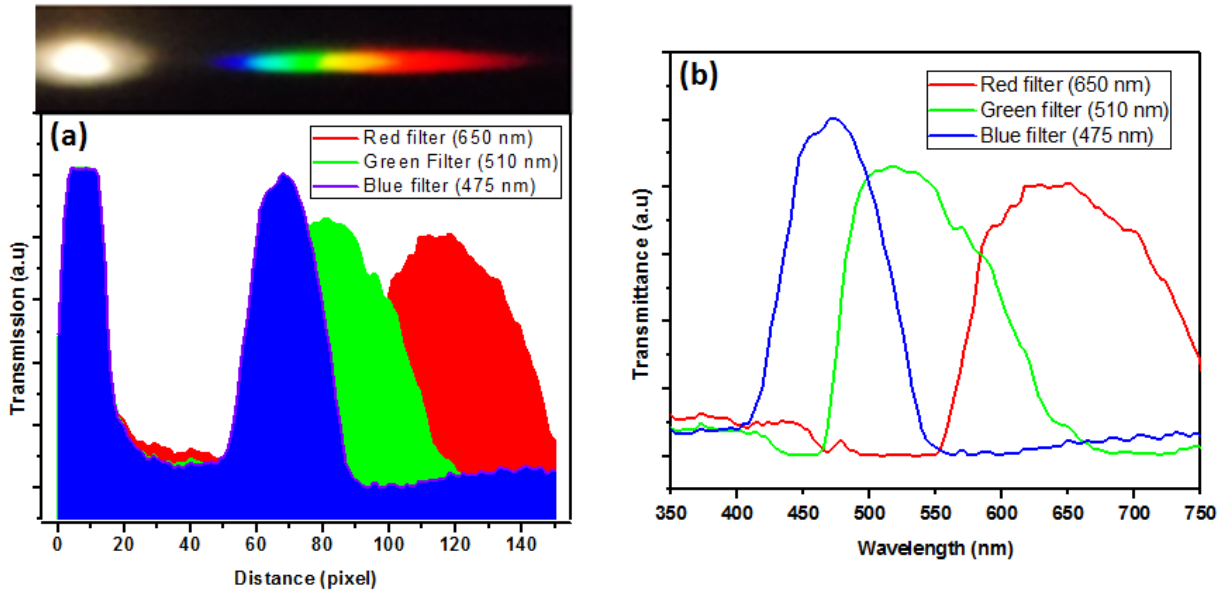

Fig. S3: (a) The diffraction image and corresponding line profile (transmittance versus pixel location), and (b) The calibrated line profile (transmittance versus wavelength).

UV-visible Transmittance spectra: The UV-visible measurements were conducted by using Shimadzu UV-3600. The distance between the sample position and detector was about 9 cm and the diameter of the detector was about 3 cm. The distance of the ±1 order diffraction from central spot depends upon the distance between sample and screen. Therefore, it was not possible to capture the whole diffraction spectrum by using UV-visible spectroscopy. The UV-visible transmittance spectra are shown in Fig. S4.

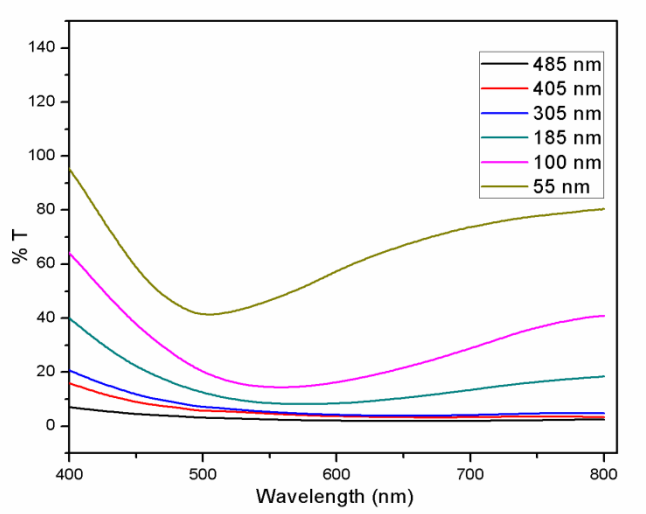

Fig. S4: The UV-visible transmittance spectra of Ag nanorods on DVD templates having different thickness values.