Effect of the thickness of the MoO3 layers on optical properties of MoO3/Ag/MoO3 multilayer structures

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Résumé en anglais	The electrical and optical properties of MoO_3/Ag/MoO_3multilayerstructures have been studied using the Agdeposition rate and layer thicknesses as parameters. When the silverfilm is deposited at 0.20 nm/s rate, the silver layer thickness necessary to achieve the percolation threshold of the resistivity ρ towards conductive structures is 10 nm. Below 10 nm, the films are semiconductor and above the films are conductors. In the present work, the variation of the thicknesses of top and bottom MoO_3 layers is shown to strongly modify the optical properties of the multilayerstructures. By using a Ag thickness of 10 nm, we demonstrate an increasing of the transmittance of the MoO_3/Ag/MoO_3structures by optimizing the MoO_3 layers thicknesses. When the MoO_3 bottom layer is 20 nm thick, and the MoO_3 top layer is 35 nm, the maximum transmission is 86% at the wavelength of 465 nm, while the averaged transmission in the visible range (350 nm–800 nm) is 70%. The best measured conductivity, $\sigma = 1.1 \times 10^5$ $(\Omega\ cm)^{-1}$, corresponds also to this MoO_3 (20 nm)/Ag (10 nm)/MoO_3 (35 nm) structure. A good qualitative agreement between the theoretical calculations of the variation of the optical transmittance and reflectance of the MoO_3/Ag/MoO_3structures is also highlighted.
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