



Cu-Ag bi-layer films in dielectric/metal/dielectric transparent electrodes as ITO free electrode in organic photovoltaic devices

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Résumé en anglais	<p>Among ITO alternative, dielectric/metal/dielectric multilayer structures are one of the most often studied possible substituent. However, if their optical and electrical properties are systematically investigated it is not the same with regard to their mechanical properties. In the present manuscript we have studied the properties of ZnS/Cu/Ag/ZnS, ZnS/Cu/Ag/MO₃ (with M $\frac{1}{4}$ Mo or W) structures. With a maximum transmission of 90% and a sheet resistance of 5 U/sq the optimum structure exhibits a figure of merit of 82 10⁻³ Ω^{-1} when $l = 600$ nm. Beyond these standard measures we proceeded to the study of the mechanical properties of the multilayer structures. The inner and outer bending tests show that the ZnS/ Cu/Ag/ZnS (or MO₃) structures are more flexible than ITO, while their responses to scotch tests show that they exhibit a large adhesion to the substrate, glass or plastic. The scratching adhesion test puts in evidence that the adhesion to the substrate of the Ag layer is smaller than that of ZnS/Cu/Ag/ZnS, which is smaller than that of ITO. On the other hand, this test shows that the ZnS/Cu/Ag/ZnS (no cracks for $L = 25$ N) is less brittle than ITO (cracks $L = 15$ N). Finally, when used as anode in organic solar cells, the structure ZnS/Cu/Ag/WO₃ allows achieving the best efficiency, similar to that obtained with ITO.</p>
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Liens

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