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Optical Simulation of Transparent Electrode for Application to Organic Photovoltaic Cells

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The optical characteristics of transparent electrode with various kind of materials and thickness to be used for organic photovoltaic cells were studied by simulation methodology. It demonstrated that the transmittance varies with the kinds of materials, the number of layers and change in the thickness of each layer. In the case of the structure composed of dielectric/Ag/dielectric, optimized transmittance was higher than 90% at 550 nm and the thickness of the Ag layer was ~10nm. Top and bottom dielectric materials can be changed with different refractive index and extinction coefficient. The relation between the optical transmittance of device and transparent electrode with different refractive indices was discussed as well. By processing numerical simulations, an optimized optical transmittance can be obtained by tuning the thickness and materials of transparent electrode.

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