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Optical Analysis of Thin Films for Photovoltaics Technology: Spectroscopic Ellipsometry of Multi-Layer Transparent Conducting Oxide Films KEVIN WELLS, Ohio Northern University — Spectroscopic ellipsometry (SE) is extremely useful in photovoltaics research for determining the optical properties of solar cells from the polarization state change that occurs when polarized light is reflected at an oblique angle from the surface. Tec-15 glass is a commercially produced glass that is coated with transparent conducting oxide layers and is used as a substrate in the production of solar cells. Using various techniques, we have developed a model for the dielectric functions of the layers on Tec-15 glass that leads to an improvement in the quality of the fit to SE data over that provided by previous models. This improvement came primarily from substituting Tauc-Lorentz oscillators for Lorentz oscillators in the previous models. Further analysis found that this model can be further improved in the future through the use of transmittance measurements in addition to the SE measurements.

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