

**SESSION 8: POSTER, GRAND PACIFIC BALLROOM**

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## **An antireflective TCO film for CZTS solar cells**

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### **ABSTRACT**

This paper investigates the use of the antireflective effect of a transparent conductive oxide (TCO) film to increase the incident light transmitted into  $\text{Cu}_2\text{ZnSnS}_4$  solar cells (CZTSSCs) and thus improve the cell efficiency. A new type of TCO film with better antireflective properties across a wide wavelength range is introduced. A  $\text{SiO}_2/\text{ZnO}$  antireflective TCO (ATCO) is designed under AM1.5 illumination. An effective average reflectance method (EAR) is introduced to measure the antireflective effect over the 300–800 nm wavelength range. To fully consider the effect of the refractive index dispersion and the coupling of the TCO or ATCO films with the active layer, a multi-dimensional transfer matrix is applied to optimize the thickness of each key layer to accurately determine the best antireflective effect to improve photovoltaic conversion efficiency.

**KEYWORDS:** antireflective coatings, CZTS