

## Poster-Session

### Exceptionally high in-air stability of transparent conductive oxide SnO<sub>2</sub>:Ta

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The in-air-stability of the transparent conductive oxide SnO<sub>2</sub>:Ta (TTO) thin films at 650 °C and 800 °C is studied under lab oven and solar furnace conditions. The optical spectra after the treatments were unchanged (Figure), and the X-ray diffractograms revealed the conservation of a single-phase rutile-type crystal structure. Strong Raman lines out of the phonon range of SnO<sub>2</sub> were assigned the Sn vacancy- and O interstitial-type point defects based on experimental spectra and ab initio calculations of pristine and Ta-doped SnO<sub>2</sub>. These defects were partially healed during high-temperature exposure, without affecting the optical properties of TTO under these harsh conditions. The study provides a comprehensive understanding of crystal and defect structure of TTO prior to and after high temperature treatment in air for the first time and encourages its application in different fields where transparent conductive oxides with high-temperature and oxidation stability are required.

