Contribution ID: **484** Type: **Poster Presentation**

A Comparative Study of VO2 Doped with In and Ga for Thermo-chromic Window Application

Thermochromic energy-efficient windows have been investigated intensively ever since the rise of an energy-efficient model for VO₂-based windows. However, pure VO₂ possesses an energetic difference of low-to-high-temperature infrared transmittance lower than 10% and visible transmittance at about 40%, which limits its commercial application as a coating material for smart windows. This work uses the method of elemental doping to lower the transformation temperature and improve the optical transmittance. Indium (In) and Gallium (Ga) were doped on VO₂ and the first principle calculations were used to calculate the structural, electronic and optical properties. These calculations are helpful for the experimental search of dopants used in the thermochromic VO₂ smart window.

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Session Classification: Poster Session

Track Classification: Track F - Applied Physics