

All-Oxide Solar Cells: NiO/Cu₂O/ZnO/SnO₂ Heterojunction (PV-2)



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Scientific Achievement:

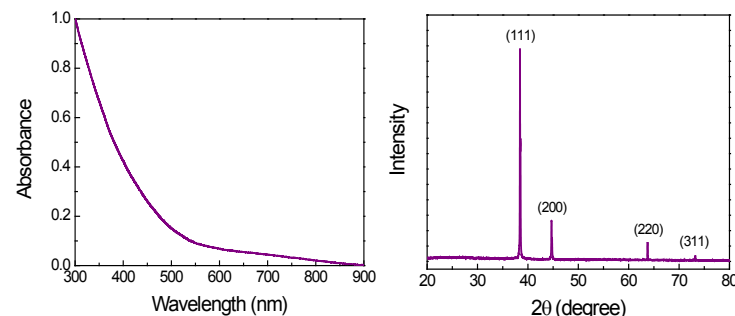
Formation of *pn*-junction solar cells with a layer of *p*-type Cu₂O and a layer of *n*-type SnO₂ nanoparticles. Band-edges of the materials with respect to their Fermi energy from STS measurements were used to derive the energy band-diagram. The all-oxide inorganic heterojunction solar cells have a photo-conversion efficiency in excess to 1%.

Significance and Impact:

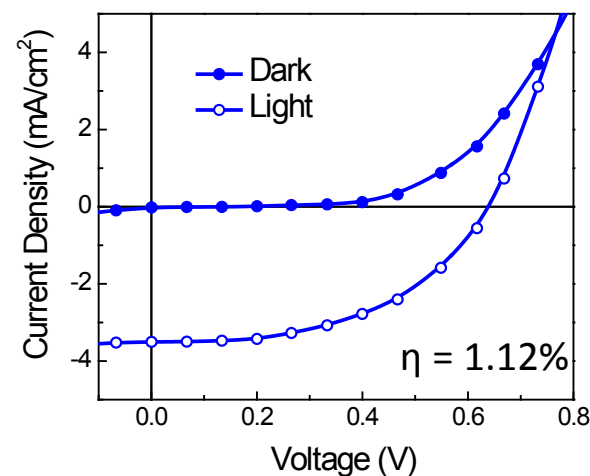
Deposition of uniform, highly crystalline, and single-phase Cu₂O thin films by Successive Ionic Layer Adsorption and Reaction (SILAR). Compared to electrochemical deposition and thermal annealing processes, SILAR produces thin films with comparable quality, at much lower cost.

Research Details:

- Fabrication and characterization of Cu₂O thin films by SILAR.
- Formation of all-oxide heterojunction thin-film solar cells with Cu₂O as the active material.
- In-depth characterization of the photovoltaic devices.



Absorbance spectrum (left) and X-ray diffraction pattern (right) of Cu₂O thin film.



JV profile of heterojunction cells.

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