

8.3.3 Summary to: 8.3 Making Thin Film Solar Cells

Thin film solar cells need to meet some key requirements:

- Process-compatible and cheap substrate \Rightarrow large area deposition.
- Suitable direct band gap \Rightarrow high absorption coefficients f
- Insensitivity to "defects"
- Technology for junction and good ohmic contacts.

Major contenders in (or close) to production are:

- Amorphous **Si**.
- Nanocrystalline thin film **Si**.
- Polycrystalline thin film **Si**.
- The **CuIn_xGa_{1-x}Se₂** or "**CIGS**" family.
- The **CdTe** solar cell.
- May others in **R&D**

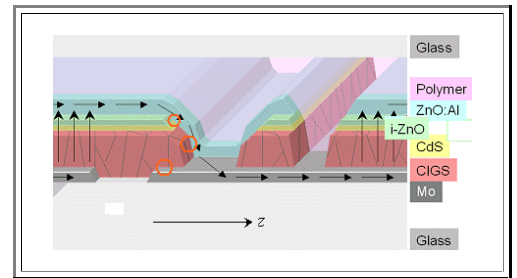
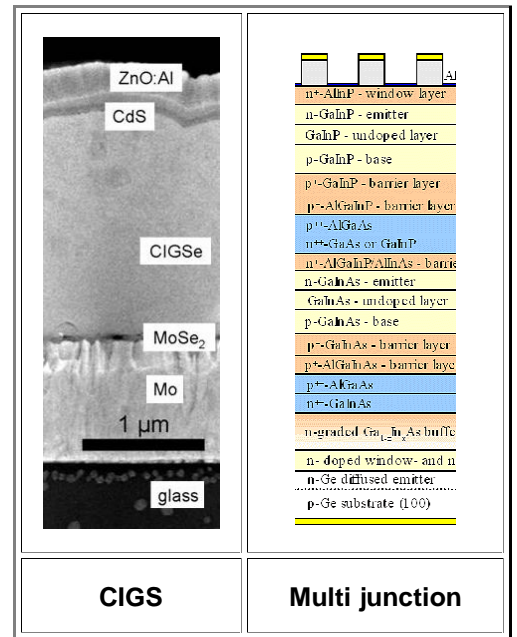
The present "high potentials" are **CdTe** and **CIGS**.

High-efficiency multi-junction solar cells may find applications as "concentrator cells" at the focus point of a large mirror or lens that tracks the sun.

CIGS and most other thin film solar cells have high internal resistances and need to be switches in series after about **1 cm** for high performance

- This must be done automatically and in-situ as part of the production process.
- A whole new technology needs to be developed for thin film solar cell mass production

The race between bulk **Si** solar cells and thin film technologies is open in **2008**; the winning technologies are to be determined.



Exercise 8.3-2

All Quick Questions to 8.3