

# CdSe Solar Cell Fabrication

User Needs and Requirements

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# Project Overview

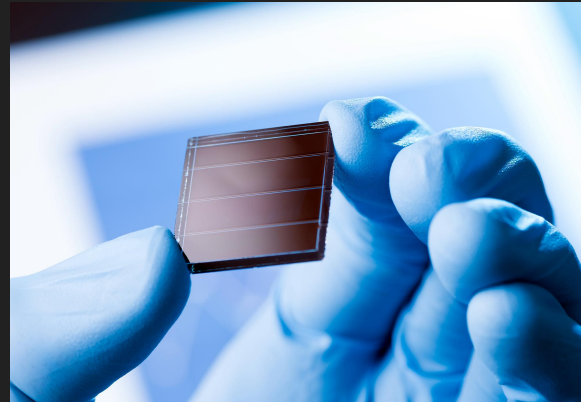
- Cadmium Selenide is an undeveloped solar cell material that could help increase the efficiency of silicon solar cells.
- Very little work has been done to develop the fabrication process for CdSe solar cells.
- Major companies like first solar are starting to show interest in the material.
- It is suspected that CdSe can be manufactured in a similar process as CdTe, a material with a well defined process.
- It is our goal to fabricate a CdSe cell with 5% efficiency and write a well written report on everything we learn through our fabrication process.

# User Needs

- Our users include everyday customers of the electrical grid, as well as engineers trying to develop CdSe.
- Users of the electrical grid have similar needs and different wants.
- Users all need reliable and affordable access to energy.
- Some prefer that the energy is renewable, some prefer to use fossil fuels, and some only care that it is cheap and reliable.
- Our project is geared towards those interested in renewables, and those interested in cheap reliable energy.
- Our engineering users prefer honest, well reported data and conclusions.

# Requirements

1. A well documented process for fabricating a CdSe cell.
2. Our CdSe cells along with well written data and conclusions.
3. A report on the economics of CdSe when compared to other solar alternatives.
4. A report on practical industry manufacturing techniques, which will differ from what we do.



# 5% Percent Efficiency

- 5% efficiency is our goal, but not an expectation.
- ISU graduate students are not consistently achieving this value of efficiency.
- We have significantly less experience with the delicate fabrication process for solar cells.
- We are more focused on thorough conclusions, data, economic research, as these are beneficial to others researching the subject matter.

# Practical industry manufacturing

- The process we have access to at ISU will be different from what industry will use.
- We only have access to Chemical Vapor Deposition, which is not as efficient as methods like high-speed vapor transport, which is used by first solar.
- We will need to research industry manufacturing techniques to report on it, and to apply this to our economic analysis.

# Engineering Standards

- Safety Data Sheet for Cadmium
- Safety Data sheet for Selenium
- Chemical Vapour Deposition (CVD): Advances, Technology, and Applications. (CRC Press)
- SAE AMS03-28 PART 2: Physical Vapor Deposition of Metals: Physical Vapor Deposition of Cadmium for Protection Against Corrosion

# Conclusions

- Our primary users are engineers, who need us to report accurate and reputable data.
- We have end users, who will utilize a product that we helped develop.
- Their interests are, and affordable and reliable energy from clean renewable sources