CdSe Solar Cell Fabrication

Problems and Users

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Project Overview

- Cadmium Selenide (CdSe) is an undeveloped, but promising material that could innovate the solar cell market.
- It can be used in unison with existing Silicon Solar cells to increase the overall efficiency of solar panels.
- CdSe is very closely related to a current solar cell material, Cadmium Telluride (CdTe) and it is hypothesized that a similar manufacturing process can be utilized to fabricate CdSe.
- This process is already efficient and economically viable, and serves as proof of concept for CdSe.
- Knowledge of CdTe manufacturing process may speed up development on CdSe.

Problem Statement

- The benefits of CdSe development have drawn the attention of Solar Cell fabricators.
- First Solar, the leading developer of CdTe solar panels is very interested in this technology.
- Our client, Vikram Dalal, who works closely with first solar has tasked us with:
  - Coming up with a fabrication process that achieves a rudimentary 5% efficiency in CdSe.
  - Studying the economics of the material and implementation into the solar cell market.
  - Comparing the economics of the material to current solar cell technology.

Personas:

- Mikki Nimaj - First Solar Engineer:
  - Works on First Solar's R&D team to improve CdSe.
  - Her work is her passion, and she spends much of her free time reading literature about semiconductors, more specifically those used in the solar industry.
  - She would greatly benefit from other research on CdSe as she wishes to use the material for her development of higher efficiency solar cells
- Lisa Simpson
  - Big time environmentalist.
  - Is slowly losing hope about the future of our planet, but continues to push environmentally centered ideologies.
  - Firmly believes in using renewable energy over fossil fuels, due to concerns about global warming.
- Chet Flanders
  - Climate change denier.
  - Runs a very successful landscaping company that has expanded to several towns in his area.
  - Very economically minded, and ecstatic to see cost reductions in any aspect of his business.

User Needs:

- Person #1
  - Accurate data with conclusions in a well documented report on CdSe.
  - More published literature on the topic.
  - Information on potential feasibility of CdSe.
- Person #2
  - Any good news regarding the future of the planet.
  - Ethically sourced energy to make her feel less guilty about using electricity.
  - Needs documentation that can provide important information without much technical jargon.
- Person #3
  - Any reason other than global warming to be interested in renewable energy.
  - The electricity costs from his warehouse to go down.
  - Interested in seeing how the technology could work to bring down prices over the coming decades.

Conclusions

- Our project is slightly non-traditional.
- We are making a product, but our product is not our most important deliverable.
- Our single most important deliverable is our reporting.
- Our end goal is to provide new information about a fabrication process.
- We ultimately need to deliver well-documented data by writing a report