



Inventors

Meng Tao

Professor

*School of Electrical,
Computer, and Energy
Engineering*

Wen-His Huang

Research Assistant

*School of Electrical,
Computer, and Energy
Engineering*

Intellectual Property Status:

Pending

Contact

Bill Loux

*Director of Business
Development, Physical
Sciences*

*Arizona Technology
Enterprises, LLC (AzTE)*

P: 480.884.1992

F: 480.884.1984

BLoux@AzTE.COM

TECHNOLOGYVENTURES@AzTE.COM

www.AzTE.com

A Process to Recover Silver from Silicon Solar Cells

AzTE Case #M16-027P

Background

During production of silicon solar cells, there is a large percentage of cells which do not meet quality requirements. These cells include broken, low-efficiency, and other defective cells, adding up to about 5% of all the cells produced. Although low-efficiency cells can be sold at discounted prices, they typically end up in landfills. These cells contain sufficient valuable materials (i.e. silver and solar-grade silicon) to cover the cost of recovery. Thus, scientists are now looking to find effective methods of recovering materials from silicon solar cells.

Invention Description

Researchers at ASU have developed a method to recover silver from silicon solar cells. The method works by dissolving the cell in acid to separate the components of the cell. Next, an acid or salt containing chlorine is added to produce solid silver chloride, which is simple to separate. Electrowinning (passing a current through the solution to reduce the metal, or in other words, to accept electrons) with enough voltage and time deposits the silver left in the solution as a solid that is easily separable. The overall process results in potential recovery of over 95% of silver in silicon solar cells. Furthermore, waste products from the steps have well-established procedures to prevent adverse environmental effects. In summary, the silver recovery process can recover over 95% of the silver in silicon solar cells with a net profit due to silver's higher selling price than the cost of recovery.

Potential Applications

- Fuel Cells and Energy
- Solar Cell Manufacturing
- Semiconductors and Electronics

Benefits and Advantages

- **Inexpensive and Effective** – The process makes it possible to recover over 95% of silver from silicon solar cells at a lower cost than the silver resale price, resulting in a net profit
- **Simple and Environmentally-Friendly** – The process employs only one inorganic acid for silver recovery and produces waste with well-established handling procedures to prevent adverse environmental effects