Electrodeposition of Silicon

Title: Electrodeposition of Silicon

Invention: This technology is a new method for producing high quality polycrystalline silicon that targets photovoltaic cell manufacturers and other thin film silicon applications. The technology uses a newly discovered reference electrode that allows silicon to be refined from materials that previously could not be tapped. The new method and materials will lower the cost of PV cells and lower the power consumption required by the current production process.

Background: Polycrystalline silicon is easier to produce in a lab but has varying levels of purity. Silicon is heated up on a substrate and crystallizes as the molten silicon cools, resulting in the final product. Producers of solar grade crystalline silicon have been tirelessly working to drive down costs with most resorting to using metal induced crystallization. The electrode presented here opens new methods to accomplish electrodeposition of silicon with relatively inexpensive metals.

Applications:

• Silicon electrodeposition to produce solar PV cells
• Creation of a variety of metal-silicon thin films
• Conducting gate materials for semiconductors
• Thin-film transistors

Advantages:

• Reduces costs via use of cheaper materials
• Requires less power consumption than other methods of electrodeposition

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