

SRI's Solar Silicon Process



SRI International has developed a novel production process for manufacturing solar-grade silicon that is

- *Low-cost: half the cost of Si produced using Siemens Process*
- *High-purity (<0.02 ppm of impurities)*
- *Suited to use in single crystal, polycrystalline, or silicon film ribbon production*
- *Ready for large-scale production, with much lower CapEx than required for a Siemens-type plant*

Market-Ready to Meet Growing Demand for Solar-Grade Silicon Feedstock

Demand for solar energy is growing rapidly as a result of both consumer interest and public policies designed to address environmental and energy security concerns. SRI's technology addresses the industry's critical need for a process to produce low-cost solar-grade silicon.

Our silicon production process uses only low-cost, readily available starting materials, primarily sodium and hexafluorosilicate (which is converted into silicon tetrafluoride). Benefits of this process include

- *Atmospheric pressure operation*
- *High-throughput batch or semi-continuous operation*
- *Low power compared to alternative processes*
- *Low capital requirements*
- *High yield*

Silicon produced from our process has been grown into single crystal solar cells with efficiencies in excess of 15 percent. The technology has the potential to be used directly to obtain cast polycrystalline silicon ready for wafering. As a result, companies may be able to integrate vertically with production of single crystal or polycrystalline silicon ingots for photovoltaic cell production.

SRI's low-cost solar-grade silicon process produces silicon feedstock for single crystal, polycrystalline, or silicon film ribbon.

SRI's bench-scale reactor has produced 4.0 kg Si/hour (equivalent to 10-15 tonnes/year). SRI has designed a production reactor for 1000 tonne/year.

Technology Commercialization

Thus far, SRI has entered into seven licenses for its silicon production process and intends to expand its activities in this area by entering into additional licenses.

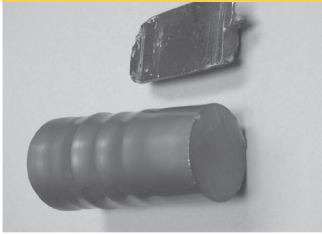
Potential partners include

- *Established and new silicon producers*
- *Solar cell makers who need a reliable, low-cost internal source of silicon*
- *Chemical companies that want to enter the solar silicon supplier market*
- *Entrepreneurs*

Market Entry Timeline

SRI works with its licensing partners to transfer the technology. Although timing will vary with each partner's commitments and schedule, SRI anticipates that partners will be able to complete construction along the following timeline:

- *Months 0 to 6: transition technology and design pilot plant (~25 tonne/year)*
- *Months 6 to 18: start-up pilot plant; expand design to 1000 tonne/year plant*
- *Months 18 to 36: build 1000 tonne/year plant*



Silicon feedstock



SRI's Experience with Solar Initiatives

SRI has been involved in many aspects of the solar cell industry, including

- Production of materials for solar cells (e.g., silicon, cadmium telluride, copper indium diselenide)
- Development of diffusion, metallization, and passivation technologies
- Deposition of thin and thick films on a variety of substrates
- Solar concentrator design
- Technology evaluation
- Consulting for corporations seeking to enter the solar cell value chain

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About SRI International

Silicon Valley-based SRI International is one of the world's leading independent research and technology development organizations. SRI, which was founded by Stanford University as Stanford Research Institute in 1946 and became independent in 1970, has been meeting the strategic needs of clients and partners for more than 60 years. The nonprofit institute performs sponsored research and development for government agencies, businesses, and foundations. SRI also licenses its technologies, forms strategic alliances, and creates spin-off companies. In 2008, SRI's consolidated revenues, including its wholly owned for-profit subsidiary, Sarnoff Corporation, were approximately \$490 million.

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