

Si, Ge, Si-Ge, and GaAs thin films on flexible metallic substrates for fabrication of thin-film solar cells

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Technology Summary

The central challenge of solar energy conversion is the low power density of sunlight at the earth's surface. To compete with fossil-fuel-generated electricity, flat-plate photovoltaic (PV) panels require inexpensive, high-quality, crystalline materials on low-cost substrates. Silicon PV has demonstrated manufacturability and accounts for more than 80% of photovoltaic panels today. They are reliable, efficient, and based on a semiconductor made from an inexhaustible raw material. However, today's solar cells rely on silicon wafers that are energy- and capital-intensive to produce from sand. Crucially, the high cost of wafers means wafer-based modules will not surpass the DOE cost goal of \$1/Watt and cannot compete with electricity from traditional fuel sources without subsidies. We are developing an alternative silicon photovoltaic technology capable of reducing PV module costs to below \$0.50/W.

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