Room temperature superconductivity for solar power generation

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These discoveries strengthen hopes for solution of the century-old problem of creating materials that are superconducting at room temperature.

If successful, the approach could lead to the discovery of high-temperature superconductors that work in practical settings, potentially even at room temperature if they exist.

The use of room temperature superconducting materials can reduce the resistance when current flows and improve the power conversion efficiency of photovoltaic cell modules.

If we succeed in making a room-temperature superconductor, then we can address the billions of dollars that it costs in wasted heat to transmit energy from power plants to cities.

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Exploring materials with high temperature coefficient and low hysteresis to reduce voltage drop at the beginning of discharging is essential for high energy output.

A room-temperature superconductor is a hypothetical material capable of displaying superconductivity above 0 °C (273 K; 32 °F), operating temperatures which are commonly encountered in everyday settings. As of 2023, the material with the highest accepted superconducting temperature was highly pressurized lanthanum decahydride, whose transition temperature is approximately 250 K (-23 °C; -10 °F) at 150 GPa.

When combined together, the atoms lanthanum and hydrogen can superconduct electricity--and suggest new inroads toward the holy grail of room-temperature superconductivity.

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In late 2024 and early 2025, credible scientific reports suggest we may be closer than ever to making room-temperature superconductivity a reality. But what does this mean--and why should you care?

For decades, researchers have been attempting to create a superconductor that works at normal temperatures and pressures, known as room-temperature superconductors.

In principle, a room-temperature superconductor could lead to more compact wind turbines that are easier to build and less resource-intensive, says Susie Speller, a materials scientist...

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