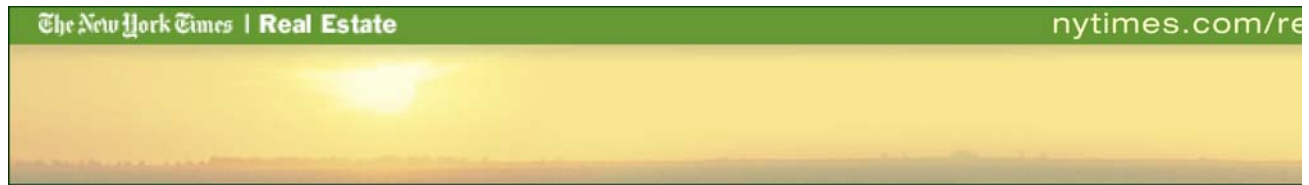


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Creating electricity with wind and wire

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BANGALORE, India--A scientist in India is examining ways to generate electric current by blowing gas onto a wire.

Right now it's only an observed phenomenon, but practical application of the idea could lead to highly efficient gas sensors or wind generators without moving parts. The phenomenon, informally called the "Sood Effect," was discovered by professor Ajay Sood of the India Institute of Science.

The concept seems relatively simple. When gas is directed onto an inclined wire, it creates a pressure gradient, similar to what happens when wind hits an airplane wing. This causes the temperature of the wire to change, which in turn generates a slight electrical current. The phenomenon occurs because of two well-known principles in physics: Bernoulli's Principle, which describes how pressure gradients are formed through an incline, and the Seebeck Effect, the observation that pressure changes lead to temperature differentials that create current.

Sood first noticed the effect in 2003 when he was studying how liquids applied to a carbon nanotube can direct the flow of electrons.

"The momentum of the liquid will drag the carriers," he explained. Since then, he has been experimenting with nitrogen and other gases on semiconductors and has been finding that the basic rules continue to apply.



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"The effect is not unique to nanotubes," he said in an interview at the institute.

If it's so pervasive, then why hasn't anyone discovered it yet? "I don't know," he said with a shrug.

Potentially, the effect could be incorporated into the design of a number of products by combining several wires into a bundle.

The India Institute of Science, located here, is the country's leading scientific organization and graduate school. Every year, more than 100,000 college students compete in rounds of tests and interviews for a few hundred spots, said M.L. Munjal, chairman of the mechanical sciences division at the institute. The acceptance rate is 0.3 percent. In all, there are 2,000 students and 450 faculty. Ph.D. theses must be reviewed by foreign panels for certification.

Among other projects, Sood is studying the sort of pressures that nanotubes can withstand, why water freezes at minus 60 degrees Celsius inside nanotubes, and how they interact with DNA.

Carbon nanotubes have become a miracle material of sorts in the scientific world for their unusual properties. They conduct electricity better than metals and are far stronger than steel, but they also bend. "When you release pressure, they come back with a vengeance," he explained.

The properties may one day lead to new types of semiconductors or lighter, stronger aircraft parts. Some scientists also believe that nanotubes could be used to create space elevators, miles-long strings of carbon that would ferry people and supplies up to space stations tethered at the other end.

Like Freeman Dyson of the Institute of Advanced Study in Princeton, N.J., however, Sood is skeptical of the elevator concept.

"It is a nice fantasy," he said. "I would like to believe it."

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