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Canadian Professor Develops Plastic that More Efficiently Converts Solar Energy

by Tara Brautigam

TORONTO - Researchers at the University of Toronto have invented an infrared-sensitive material that's five times more efficient at turning the sun's power into electrical energy than current methods.

The discovery could lead to shirts and sweaters capable of recharging our cellphones and other wireless devices, said Ted Sargent, professor of electrical and computer engineering at the university.

Sargent and other researchers combined specially-designed minute particles called quantum dots, three to four nanometres across, with a polymer to make a plastic that can detect energy in the infrared.

Infrared light is not visible to the naked eye but it is what most remote controls emit, in small amounts, to control devices such as TVs and DVD players.

It also contains a huge untapped resource - despite the surge in popularity of solar cells in the 1990s, we still miss half of the sun's power, Sargent said.

"In fact, there's enough power from the sun hitting the Earth every day to supply all the world's needs for energy 10,000 times over," Sargent said in a phone interview Sunday from Boston. He is currently a visiting professor of nanotechnology at the Massachusetts Institute of Technology (news - web sites).

Sargent said the new plastic composite is, in layman's terms, a layer of film that "catches" solar energy. He said the film can be applied to any device, much like paint is coated on a wall.

"We've done the same thing, but not with something that just sit there on the wall the way paint does," said the Ottawa native.

"We've done it to make a device which actually harnesses the power in the room in the infrared."

The film can convert up to 30 per cent of the sun's power into usable, electrical energy. Today's best plastic solar cells capture only about six per cent.

Sargent said the advance would not only wipe away that inefficiency, but also resolve the hassle of recharging our countless gadgets and pave the way to a true wireless world.

"We now have our cellphones and our BlackBerries and we're walking around without the need to plug in, in order to get our data," he said.

"But we seem trapped at the moment in needing to plug in to get our power. That's because we charge these things up electrically, from the outlet. But there's actually huge amounts of power all around us coming from the sun."

The film has the ability to be sprayed or woven into shirts so that our cuffs or collars could recharge our iPods, Sargent said.

While that may sound like a Star Trek dream, venture capitalists are keen to Sargent's invention.

Josh Wolfe, managing partner at Lux Capital, a New York City-based venture capital firm, said while such a luxury may be five years away, the technology knows no bounds.

"When you have a material advance which literally materially changes the way that energy is absorbed and transmitted to our devices... somebody out there tinkering away in a bedroom or in a government lab is going to come up with a great idea for a new device that will shock us all," he said in a phone interview.

"When the Internet was created nobody envisioned that the killer app (application) would be e-mail or instant messaging."

Sargent's work was published in the online edition of Nature Materials on Sunday and will appear in its February issue.

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