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Solar Power Without Solar Cells?

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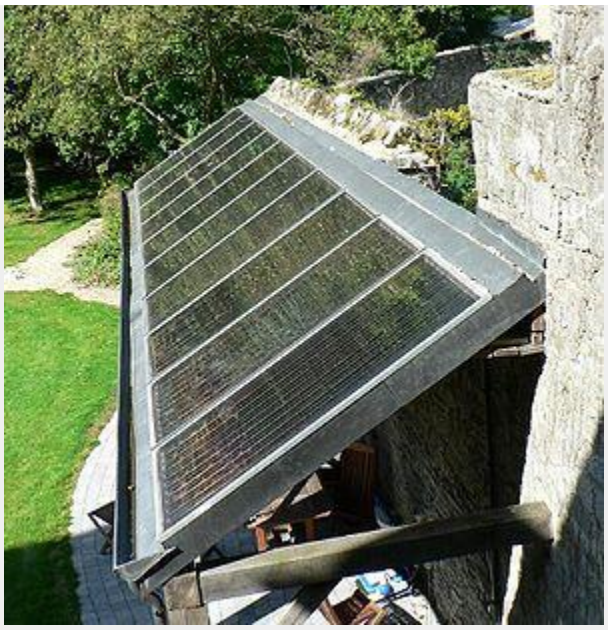

Could solar cells become a thing of the past? (Image via Wikipedia)

One of the most frustrating things about thinking of solar power conceptually is the high cost of manufacturing solar cells. After all, the sun is just *up there*, generating tons of photonic energy and distributing it around the planet. We need energy for our civilization, and there it is — all around us. But we have to go through an enormously expensive process to capture it. It's as though we needed water while it was raining — but had to go through a multistep, expensive process just to build a bucket.

Well, if a breakthrough discovered by researchers at the University of Michigan pays off, we may be well on our way to building a better bucket to capture all that loose solar energy. Professor Stephen Rand and his associate, William Fisher, have discovered that, at the proper intensity, the magnetic

properties of light could potentially be harnessed to generate voltage. No solar cell required.

Light has electric and magnetic components. Until now, scientists thought the effects of the magnetic field were so weak that they could be ignored. What Rand and his colleagues found is that at the right intensity, when light is traveling through a material that does not conduct electricity, the light field can generate magnetic effects that are 100 million times stronger than previously expected. Under these circumstances, the magnetic effects develop strength equivalent to a strong electric effect.

“This could lead to a new kind of solar cell without semiconductors and without absorption to produce charge separation,” Rand said. “In solar cells, the light goes into a material, gets absorbed and creates heat. Here, we expect to have a very low heat load. Instead of the light being absorbed, energy is stored in the magnetic moment. Intense magnetization can be induced by intense light and then it is ultimately capable of providing a capacitive power source.”

What makes this possible is a previously undetected brand of “optical rectification,” says William Fisher, a doctoral student in applied physics. In traditional optical rectification, light’s electric field causes a charge separation, or a pulling apart of the positive and negative charges in a material. This sets up a voltage, similar to that in a battery. This electric effect had previously been detected only in crystalline materials that possessed a certain symmetry.

Rather than the expensive process of creating semiconductors to capture this energy, the potential materials needed to obtain this effect are much cheaper. They could use glass — or possibly even transparent ceramics. If that works, it would make the manufacturing process much cheaper.

Obviously, this is still conceptual — the lab’s next step is to harness voltage using a laser. If successful, they will then work on sunlight. So this tech, if it works, is still years, if not decades off. Still, it provides a promising avenue for cheaper solar power