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Minuscule windmills can recharge a dead phone's battery

Novel concept for green technology comes from the University of Texas

Researchers at the University of Texas (Arlington) have taken the windmill and miniaturized it — so much so that it can actually be applied to one's smartphone to serve as an emergency source of green power.



Now, while that description might seem a bit far-fetched, it is in fact what Smitha Roa and J.-C Chiao, the engineers behind this crazy concept, have done. Their micro-windmills measure approximately 1.8 mm in diameter — about the size of a pinhead. They were able to achieve this remarkable feat of design prowess by using flexible nickel alloy, and combining traditional origami concepts with conventional wafer-scale semiconductor device designs.

"The micro-windmills work well because the metal alloy is flexible and Smitha's design follows minimalism for functionality," Chiao explained.

Roa and Chiao came up with the idea while exploring green technology concepts on the smaller scale. Their design has been perfected to the point that they can fit 10 micro-windmills on a single grain of rice.

What's more, the concept has proven so worthwhile that Taiwanese company WinMEMS Technologies Co. has already secured exclusive rights to commercialize the concept.

"The company was quite surprised with the micro-windmill idea when we showed the demo video of working devices," Rao said. "It was something completely out of the blue for them and their investors."

"It's very gratifying to first be noticed by an international company and second to work on something like

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The micro windmills were first successfully tested in September 2013, when the duo discovered that the windmill's unique, aerodynamic design, coupled with the durable nickel alloy, allowed it to operate under strong artificial winds without fracturing.

"The problem most MEMS designers have is that materials are too brittle," Rao said. "With the nickel alloy, we don't have that same issue. They're very, very durable."

"Imagine that they can be cheaply made on the surfaces of portable electronics," Chiao adds, "so you can place them on a sleeve for your smart phone. When the phone is out of battery power, all you need to do is to put on the sleeve, wave the phone in the air for a few minutes, and you can use the phone again."

At present, an agreement has been established for UT Arlington to hold the intellectual properties while WinMEMS explores the commercialization opportunities.

UT Arlington has since applied for a provisional patent.

Story via uta.edu

By [Jeffrey Bausch](#)

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Scott ad5u

1/21/2014 3:25:55 PM

Out here in West Texas we have lots of sunny days but this could let me charge my phone in the dark on our often breezy (or windy) nights as well - when my solar panel won't work.

A lot of smaller windmills helps me prevent "all my eggs in one basket" such that a single windmill failure doesn't prevent me from charging my phone.

I envision charging while riding my bicycle at night as well. Even while skating (ice or roller) and roller blading, hiking, etc. I'd imagine it doesn't take much movement on my part to get the micro-windmills going compared to a single "large" one...



j-allen

1/21/2014 12:02:16 PM

It is not clear what advantage a zillion micro-windmills offer over a single unit big enough do the job, especially if it could fold for storage. Remember, too, that we already have excellent portable solar chargers, as well as hand-crank generators. This looks to me like just a gimmick just to show what MEMS devices can do. Reminds me of the civil engineers' concrete canoe races.



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