

12 October 2009

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University of Missouri

## [MU Researchers Develop Penny-Sized Nuclear Battery with Liquid Semiconductor](#)

*Innovation at its best*

Batteries are and will for sure be the easiest means of powering devices, included with small digital camera sensors, as well as large systems. Along the years, researchers have been making [batteries smaller and smaller](#), more powerful at the same time, but issues always arise and, in this case, the main problem is when the batteries are way larger and heavier than the overall device itself. One of the latest projects in development at the University of Missouri is a nuclear energy source that will be smaller, lighter and more efficient than regular chemical batteries.

"To provide enough power, we need certain methods with high energy density," said Jae Kwon, assistant professor of electrical and computer engineering at MU. "The radioisotope battery can provide power density that is six orders of magnitude higher than chemical batteries."

The current level of the small nuclear battery that Kwon and his researchers were able to achieve is the size and thickness of a penny. This battery is targeted at powering various micro/nanoelectromechanical systems (M/NEMS) and even though nuclear power usually involves some concerns as well, Kwon stated they are safe. "People hear the word 'nuclear' and think of something very dangerous," he said. "However, nuclear power sources have already been safely powering a variety of devices, such as pace-makers, [space satellites](#) and underwater systems."

Nonetheless, Kwon's battery doesn't come only with a small size achievement, but also with an innovative semiconductor. In this case, Kwon's battery uses a liquid semiconductor rather than the common solid semiconductor, because, as he explains himself, "The critical part of using a radioactive battery is that when you harvest the energy, part of the radiation energy can damage the lattice structure of the solid semiconductor," so "By using a liquid semiconductor, we believe we can minimize that problem."

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