Radioactive batteries keep going and going

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Radioactive batteries could not only power electronics for months or even years, but they can also help to put radioactive substances to good use.

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Minuscule amounts of radioactive elements could safely power handheld electrical devices for months or even years, according to new research from the University of Missouri.

Such **electronics** could help to eliminate mildly radioactive substances while providing cheap and reliable power.

"This is not a **nuclear reaction**. Nothing will explode; there won't be a mushroom cloud on your property," said Jae Kwon, a professor at the University of Missouri developing radioactive **batteries**.

"We are using the **radiation** coming from the material and turning that into electricity," he added.

The material in question is sulfur 35, an energy packed isotope of an element most people associate with the smell, and color, of rotten eggs. In nature, sulfur 35 forms when cosmic rays break apart argon in the upper atmosphere.

Within a **battery**, sulfur 35 spits out mildly radioactive electrons as it decays. To harvest those electrons and convert them into electricity, Kwon surrounds the sulfur with selenium, a liquid semiconductor. The selenium traps the electrons trying to escape, channeling them into a source of electricity.

Less than one milligram of sulfur 35 is contained in a package smaller than a penny. Using such a small amount helps to ensure that the levels of radiation are small, but also limits the amount of power that can be produced.

"We are talking about nanowatts of power here," said Kwon. "That power level can be increased if we use a material with a higher energy density."

Uranium or other materials that emit either more radiation or more energetic radiation should boost the power supply. Kwon is currently studying other potential power sources, but won't specify which ones.

Whatever the material, radioactive **batteries** would be ideal for small devices like environmental sensors placed in remote or difficult regions to reach, or as the power source for electronic implants that could last the lifetime of a patient, eliminating the need for
repeat surgeries.

That said, there are concerns about using radioactive materials as a power supply.

"The negatives of this are easy: This is radioactive material, which means any **battery** has to be encapsulated in a package that doesn't allow the radioactive rays to penetrate outside the package," said Mehran Mehregany, a scientist at Case Western Researve University.

Disposing of a radioactive battery also raises some concerns. Although he **half life** of sulfur 35 is only 87 days, as opposed to the more than 700 million-year half-life of some uranium isotopes, scientists wouldn't want even mildly radioactive material like sulfur 35 to leak into the environment where it could cause harmful mutations in animals or cancer in humans.

However, Kwon is quick to downplay such concerns. Kwon notes that current AA and AAA battery need a special disposal system. A similar system could be developed for radioactive batteries as well.

The biggest obstacle to producing a radioactive battery isn't the technology, notes Megregany.

"All the technology exists to create a radioactive battery," said Mehregany. "It just needs to be put in the right package."