Researchers Develop New Source of Energy Using Nanotechnology

16 August 2005

Reaction Can Occur in Microseconds on Surfaces as Small as Microchips

Countries across the world continue to search for new ways to create energy. As our current means for energy continue to deplete, thus making them more expensive to generate, governments are searching for new energy resources. Researchers at the University of Missouri-Columbia have developed a more efficient source of energy involving nano-scale particles that take only microseconds to create and can be developed on a surface as small as a microchip.

"This technology is considerably less expensive than existing chemical and physical processes," said Shubhra Gangopadhyay, professor of electrical engineering at MU. "It creates high amounts of mechanical and thermal energy and can convert that energy into electrical energy. So, the possibilities are endless in terms of what this energy can do."

The energy is developed using solid state energetic material consisting of fuel and oxidizer. The nano-engineered energetic material generates a tremendous amount of thermal and mechanical energy when ignited. Electric power is generated using the thermoelectric effect. The microfabricated devices coated with the energetic material are capable of producing tens of joules, which are units of energy, in the fraction of a second, which can be used for pulsed power applications or can be stored in charge storage devices for later use in portable electronics.

Power also is generated by converting mechanical energy produced by shock waves into electrical energy utilizing piezoelectric materials, which are materials where the positive and negative electrical charges are separated, but symmetrically distributed, so that the material overall is electrically neutral. MU researchers currently are working on the process to couple the thermoelectric and piezoelectric effect to produce energy on a single chip.

Gangopadhyay says there currently are no obstacles to overcome with the research. She points out that the process can be done on glass without affecting its surface and does not necessarily need electricity to start it. All that is needed is friction or impact.

The researchers currently are seeking a patent for this technology.

Source: University of Missouri