

Radioisotopes in MEMS and Microelectronics

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Radioisotopes are natural energy sources that can have higher energy densities higher than that of chemical energy sources. The available energy can last for hundreds of years or only a few days depending on the radioisotope used. More significantly radioisotopes can be in thin-film format, making them compatible with microelectronic dimensions. We will report on the use of these sources to realize self-powered reciprocating mechanical actuators, nanowatt batteries, self-powered light sources, self-powered plasmas, *etc.* We will present scaling laws that indicate self-powered electrostatic actuators can be scaled to submicron levels useful motion for optics can be sustained for decades. Direct conversion of stored electrical energy to RF transmission will be presented, which provides a novel method to not only sense but also transmit information. Implications for these transducers for sensor networks and future electronic systems will be discussed.