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Development of miniaturized renewable energy harvesting technology for next-generation self-powered electronic systems

The history of human beings always companies with the development of energy technology. In the 21st century, the demand for green technology is rapidly increasing owing to the energy crisis and environmental pollution problems. Among various renewable and clean energy technologies, energy harvesting technology has been regarded as a key technology for self-diagnosis and self-powered electronic systems. Energy harvesters can convert environment energy into electricity via various eco-friendly power conversion principles (piezoelectric, electrostatic, electromagnetic, etc.), which allows them to possess remarkable advantages over conventional power source like batteries. Energy harvesters can scavenge unlimited power from working environment and then provide electrical power to wearable electronics or sensor nodes. In this way, self-powered electronics without the necessity of any external power source can be realized. This overcomes the bottlenecks caused by the limited life of batteries that are served in commercial portable electronics and wireless sensor networks. Moreover, due to the green power generation methods and zero-pollution characteristic, the widespread utilization of energy harvesting technology will substantially reduce the environmental contamination caused by the disposal of batteries. In this research, miniaturized renewable energy harvesting technology for next-generation self-powered electronic systems is developed. The proposed energy harvester is optimized, fabricated, and experimentally characterized. The experiment results exhibits favorable power generation ability and adaptability to various working environment. In addition, with the designed energy harvester, a self-powered electronic device is realized and demonstrated, which verifies its great potential in self-powered electronic systems applications.

Biography

Xuan Wu received his PhD degree from Chonnam National University, South Korea. His research interests include energy-harvesting technology, flexible electronics, MEMS device design and fabrication. His research results are published in *Applied Energy, IEEE-ASME Transactions on Mechatronics, Lab on a Chip, Sensors and Actuators A: Physical, Sensors and Actuators B: Chemical*, etc. His research was rewarded as Best Paper Awards in the 5th Japan-China-Korea MEMS/NEMS International Conference and 2013 Kroean Society for Precision Engineering Conference. He was also rewarded as Outstanding Self-Financed Students Abroad by Chinese Government. Currently, he is the Professor of Mechanical Engineering at JiangSu University in China.

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