

## SPECIAL ISSUE ON SMART MECHATRONICS FOR ENERGY HARVESTING

### PREFACE



Energy harvesting is now regarded as one of the key technologies for realizing self-powered, maintenance-free, and autonomous wireless network systems for the coming next-generation Internet of Things era. The technological advancement of energy harvesting devices/systems can be achieved by the development of both mechanical and electrical aspects. This is because each aspect affects the other, and the performance of energy harvesting devices/systems is related to the performance of both aspects. Thus, it is essential to present and share the knowledge of a variety of related methodologies. With this background, this special issue focuses on state-of-the-art mechatronics technologies for energy harvesting and covers a wide range of topics including materials, mechanics, electronics, and applied systems.

From the viewpoint of materials research, S & M 2935 demonstrates a vibrational energy harvester based on electric double layer electrets. S & M 2936 clarifies the operation mechanism of self-assembled electret-based vibrational energy generators.

As examples of mechanics research, S & M 2937 demonstrates a contactless electrostatic vibration energy harvester using electric double layer electrets. S & M 2938 reports the development of a piezoelectric MEMS energy harvesting device to generate electricity from an airflow at low flow velocities.

In the context of electronics research, S & M 2939 describes a methodology to extend the working bandwidth of vibrational energy harvesters by using a voltage-boost rectifier circuit. S & M 2940 demonstrates a self-synchronized rectifier with phase information extracted from vibration energy harvesters.

From the perspective of applied systems research, S & M 2941 reports the development of a self-powered fault diagnosis system using vibration energy harvesting and machine learning.

Finally, I would like to express my sincere gratitude to the editorial staff of *Sensors and Materials* and to the reviewers for their careful and prompt reviews. I would also like to thank Ms. Tomoko Tanabe of MYU K.K. for her thorough support from the preparation of the special issue to its publication. I hope that the papers in this special issue will contribute to the advancement of energy harvesting technology.

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