

# Innovative thermoelectric conversion technologies for stand-alone power supplies for sensors

## Utilizing magnetism to develop high performance thermoelectric materials and devices

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## Summary :

In future Society 5.0, sensors will gather myriad data analyzed by AI to create new value. Thermoelectric modules are promising to supply power to innumerable sensors by directly converting ubiquitous thermal energy in the environment to electricity. In order to achieve the 200 year old dream of thermoelectric power generation application, we are challenging with new approaches. Utilizing magnetism, such as magnetic interactions and spin fluctuations, we have been able to realize significant thermoelectric enhancement. Together with thin film effects, we aim to break through beyond the traditional confines, and realize ultra-high performance thermoelectric materials. As another critical strategy we have focused on methods for module production, which are industry and mass production compatible, i.e. semiconductor thin film devices and flexible hybrid sheets. With the world's leading thermoelectric team, we aim to lead the way and create a new industry and market, utilizing thermoelectric power generation for energy harvesting to power ubiquitous IoT sensors and devices for future society.

