

Vibrating Floor for Power Generation on HEMS

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We are studying the sensor network HEMS with energy harvesting. We have clarified the average power consumption of sensor network node for HEMS. And we have estimated the power is more than 100uW considering the energy convergence efficiency. Moreover we decided to use energy harvesting as the energy source of sensor node. In our previous study, we have experimented and concluded the satisfaction obtaining more than 100uW average energy whole a day by illumination energy. In the case of using such energy, location and time is dominant condition. Our aim is to realize the location free and maintenance free HEMS. Then we have tried to study the thermal power generation. As the result we have already succeeded in showing the possibility of more than 100uW power generation by attaching the Peltier element on the human body. Thermal power generation is useful way in terms of location free. But it contains the restriction for usage, so it works only under human existence. HEMS must work under no human condition in the various scenes because HEMS would provide the safety, comfort in addition to energy saving even in the human absence situation. In this stage, we focus the vibrating power generation. Especially the power generated floor by vibration with human step is very hopeful for our aim. Our prototype floor is consists of Cantilever typed piezoelectric films which are arranged in a line and electrically connected parallel. Then we can obtain 4mJ energy by 30 sec. step using 470uF capacitor. That result shows 130uW average power is generated continuously. At present we continue to studying revised piezoelectric floor adjusting effectively resonant frequency. We will show above results.

Keywords: energy harvesting; piezoelectric; HEMS; sensor netowok; floor