Symposium (Oral) | Symposium | New development of power generation material research for IoT promoting DX in the new normal era

# [18a-Z02-1~6]New development of power generation material research for IoT promoting DX in the new normal era

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Thu. Mar 18, 2021 9:00 AM - 11:50 AM Z02 (Z02)

△：Presentation by Applicant for JSAP Young Scientists Presentation Award

▲：English Presentation

▼：Both of Above

No Mark：None of Above

11:20 AM - 11:50 AM

# ▲[18a-Z02-6]Body heat harvesting and personal thermoregulation based on wearable thermoelectric device

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Keywords:Wearable thermoelectric-battery system, Health monitoring system

We demonstrate that conventional inorganic materials can be used in wearable thermoelectric systems despite their bulky and rigid nature. In particular, we proposed a bracelet-like modular design of a thermoelectric module with a heat sink integrated with carbon nanotube based Li-S battery for body heat harvesting. This continuously produces power up to 378 μW, operating a commercial glucose sensor (64 μW) and storing the remainder in the Li-S batteries[1]. For personal thermoregulation, we propose a mat-like flexible thermoelectric system based on rigid inorganic bulk materials. Using portable batteries as power sources, the refrigerated skin temperature was lowered by several degrees which is adequate for humans to perceive coldness, according to theoretical analysis. These show potential for wearable refrigeration and body heat harvesting.

Reference:

[1] J. Kim, S. Khan, P. Wu, H. Park, C. Yu, W. Kim, Nano Energy 79,105419 (2021).