

Is the next human war over water or economy!

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Abstract

Harvesting human motion or blue energy with mechanical energy harvester is well-thought as an efficient and robust procedure nowadays. Besides, bacterial fouling to the harvester possesses serious alarms for implantation in human body or installation in water system. Here, for the first time, an antibacterial piezo-composite based on polydimethylsiloxane-zinc stannate@silver oxide (PDMS-ZnSnO₃@Ag₂O) has been proposed. The surface adornment of n-type ZnSnO₃ nanocubes (NCs) with p-type Ag₂O finished an effective bulk n-p heterojunction-based composite for energy harvesting and biological activities. The maximum output voltage, current, and power density of the made-up piezoelectric nanogenerator (PENG) are ~36 V, ~1.9 μA, and ~11.4 μW/cm², respectively, under finger tapping. The energy conversion efficiency of the PENG assessed during a capacitor (10 μF) charging is ~2.49 %, which is superior to the earlier reports. Moreover, a gram-negative bacterium model (*Pseudomonas aeruginosa*) has been selected for the biofilm formation study. Biofilm assay, antimetabolite, and intracellular ROS studies clearly reveal that the piezo-composite comprising Ag₂O is an excellent material for antibacterial activities. Thus, this work proposed an idea of utilisation of electron screen enabled antibacterial piezo-composite for efficiently harvesting human motion/blue energy incessantly with the specially designed impregnated or interdigitated electrode.

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Biography

Sarbaranjan Paria is pursuing his postdoctoral programme in Department of Polymer Nano Science & Technology with research topic of 'Commercialization of Nanocarbon Composites in Sensor and Biomedical Industries' in Jeonbuk National University, South Korea. He is having more than seven years of research experience in Materials Science and Nanotechnology. His research topic is

'Inorganic and Organic based Flexible and Efficient Piezo/Triboelectric Energy Harvester for Portable Electronics Applications'. He has contributed to more than 30 peer-reviewed journal publications in the field of Material Science. He has total citation of 972 with h-index of 20 and i-10 index of 25.