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Energy Harvesting with Zinc Oxide Based Nanogenerator: Design and Simulation Using Comsol-4.3 Software

Authors : Akanksha Rohit, Ujjwala Godavarthi, Anshua Mukherjee

Abstract : Nanotechnology is one of the promising sustainable solutions in the era of miniaturization due to its multidisciplinary nature. The most interesting aspect about nanotechnology is its wide ranging applications from electronics to military and biomedical. It tries to connect individuals more closely to the environment. In this paper, concept of parasitic energy harvesting is used in designing nanogenerators using COMSOL 4.3 software. The output of the nanogenerator is optimized using following constraints: ease of availability of the material, fabrication process and cost of the material. The nanogenerator is optimized using ZnO based nanowires, PMMA as insulator and aluminum and silicon as metal electrodes. The energy harvested from the model can be used to power nanobots, several other biomedical sensors and eventually to replace batteries. Thus, advancements in this field can be very challenging but it is the future of the nano era.

Keywords : zinc oxide, piezoelectric, PMMA, parasitic energy harvesting, renewable energy engineering
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