

## Hong Kong Student Science Project Competition 2023

Template of Extended Abstract (Invention)

(Word Limit: 1,600 words, Pages: 3 pages only)

**Team Number: SAPE228**

**Project Title:** Designing thin-sheet piezoelectric generator for energy harvesting application from micro vibration on human body

**Project Type: Invention**

*To our best knowledge, there are/are no \* similar works in the market; (if there are,) related product links are as below:*

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**The enhancement our project made / the difference with related products are:**

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*\*Please delete if not applicable. The competition values the originality of works. Students must do enough literature research to ensure that their works are unique and list relevant reference materials before starting research or invention.*

### I. Background

When a piezoelectric material is stressed or flexed, the shape of its internal crystal lattice changes, causing a separation of charges that generates a voltage.

### II. Objectives

Designing thin-sheet piezoelectric fibers for energy harvesting application in daily carry items.

### III. Methodology

When an external force is applied to a piezoelectric material, it generates an electric potential difference which can be harnessed for different purposes.

The major problem of collecting energy from micro vibration is the rectification of current. As the movement of the piezoelectric plate is frequently switching, a sensitive and effective rectifier is the key to make a viable system.

### IV. Design of Invention

The parameters are flexibility, durability, and high energy conversion efficiency using piezoelectric sheets.

To rectify small current with high fluctuation frequency, you can use a high-speed rectifier diode. These types of diodes have low forward voltage drops and can handle high switching frequencies.

### V. Application / Market Need

Piezoelectric generators are becoming increasingly popular as a way of harvesting energy from the environment because they are lightweight, durable and able to produce electricity from a variety of

sources such as sound waves, vibrations, and even footsteps or body movements.

**VI. If your team will compete the Sustainable Development Award, please indicate the specific sustainable development goal the project is related to, and provide justification for competing for this award. (*Word limit: 300 words*)**

**VII. If your team will compete the Social Innovation Award, please list the target group or social issue the project focuses on, and provide justification for competing for this award. (*Word limit: 300 words*)**

### **VIII. Conclusion**

Piezoelectric sheet generator harvest energy in daily carry items and body movement. This makes every person generate his/her own electricity which is enough for power up the mobile devices.

**Our project is developed based on previous project and the enhancement is below:**