Prifysgol Cymru
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Investigation into battery charging using energy harvesting techniques.

Abstract

During this investigation tests will be carried out to determine the capabilities of both photovoltaic (PV) cells and piezoelectric generators to charge batteries. Dependent on the results of these tests a product(s) will be developed that utilizes one or both of these energy harvesting techniques to power or charge some type of mobile device battery.

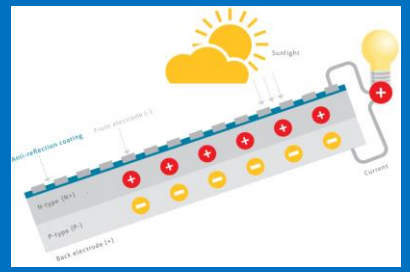

Fig.1. The Photovoltaic effect.

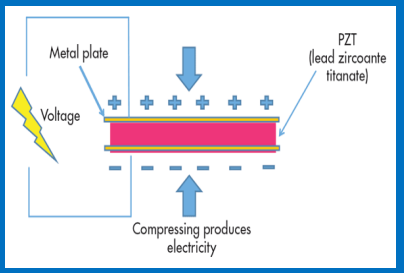

Fig.2. The piezoelectric effect.

Introduction

The motivation behind this project is the need for us as a society to reduce our dependence on fossil fuels. Renewable energy sources are already in place and in continuing development, this is helping to tackle the problem but more can be done(1). There are many other forms of energy we waste in everyday life that could instead be harnessed, and with the correct implementation be used to reduce the strain placed upon our power grids. This project aims to incorporate solar energy using PV cells, and/or mechanical energy using piezoelectric materials in to the powering of mobile devices. In doing this we can greatly reduce not only the impact on our environment but also the overall cost of energy for the consumer.

Materials & methods

Different types of PV cells and piezoelectric materials will be investigated during this project. Tests on voltages, currents and energy produced will then be carried out on the chosen materials under different environmental conditions to determine actual capabilities. Different battery types will also be investigated and tested for speed of charging and based on the results a product will be designed and developed that will incorporate these technologies.

Possible outcomes

The final product that will be developed will be some type of battery charger. The final decision on how this will be presented will depend on the results from the testing but a potential idea is to incorporate a battery and charging capabilities in to a pair of shoes.

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Reference: [1] I. I. o. physics, “energy Harvesting,” [online]. Available: http://www.iop.org/resources/energy/. [accessed 1st October 2017].