Making Energy from Vibrations or Mechanical Force

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The purpose of this project is finding another renewable energy besides solar cells or wind turbine. Piezoelectric material can generate electric energy converting mechanical force or vibration to electrical energy. Piezoelectric material can be made using kitchen materials. Rochelle crystal, piezoelectric material, is made from Baking Soda, Cream of Tartar, and Distilled Water. After making Rochelle crystal, it was tested using a multimeter. Result shows voltage varied from 182mV to 395mV for crystal weights from 2.42g to 3.97g after applying mechanical force to the crystals. Due to the non-uniform of the crystal formation, the electrical current was too small. Farther demonstration, commercial piezo discs are used as a dependent variable as well as to demonstrate if it could generate enough energy for home usage. Result shows that a single disk can light up a small decorated LED light. The energy generated from one disk is around 0.0024W. Converting efficiency is estimated around 6.7% from potential to electrical energy. About 688 – 4090 piezo discs connected in parallel or series could be enough to light up a 9W LED household light bulb. Beside applying force on the discs, it is found that applying heat on the piezo discs can also generate electricity due to thermal expansion of the material. Several novel application ideas are shown in the study. In conclusion, the larger the Rochelle crystal, the more energy was harvest. The crystals data were inconsistent due to the random crystal formation. For Piezoelectric disc, the data were consistent and showed correlation.

Awards Won: