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Study on the Dielectrics in the Piezoelectric Element to Convert Mechanical Energy to Electrical Energy WOO JAE KIM, RICHARD KYUNG, Choice Research Group — Renewable, green energy is an important field of research amidst the 21st century energy crisis. Many of the researches around the world have been consistently looking for new energy source. Applying repetitive mechanical forces to mono or multi layered ceramics element generate electrical energy. It depends on the direction of the stress, polarization, and the geometrical shape of the individual layers. The research focuses on increasing efficiency of the piezoelectric module differing the geometry of the ceramics layers and material properties. Different combinations of ceramic slabs were numerically and computationally studied in order to determine the factors affecting the capacitances in the piezoelectric module. To harvest higher energy using piezoelectric vibration, multiple layered metal oxides such as metal tantalum oxide and metal titanium oxides were considered to calculate the energy in the module. Computational software such as Matlab has been employed to calculate the distributions of electric fields and charges within the piezoelectric module in order to measure the maximum energy possible to obtain between each electrodes. Electromagnetics principles and modeling tools were used to construct the models considered in this paper.

Richard Kyung
Choice Research Group

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