Development of a Thermoelectric Generator Using Common Materials

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The purpose of my project is to develop a cheap and simple thermoelectric generator (TEG) for use in an impoverished area. A TEG can be made by relying on the Seebeck effect, a phenomenon in which a temperature difference between two dissimilar electrical conductors or semiconductors produces a voltage difference between the two materials. My design goal was to make a generator out of common materials, so a person in need of a small amount of electricity can use materials found in a landfill to make their own generator. This project had two phases. The first phase was to find which material pairing would be the best to make a simple thermoelectric generator; the selected materials being aluminum wire, carbon steel (baling wire), copper wire, and graphite. The second phase was to make a TEG with the chosen materials, find its efficiency, compare it with a BiTe TEG, and test its capabilities in real world situations. I decided to make my thermoelectric generator with the combination of aluminum wire and carbon steel wire. The pairing that generated the most electricity was Aluminum Wire and Graphite, but through testing I found Graphite to be very hard to work with, so realistically it would not be the best for use in a developing country where tools are limited. Knowing this I decided to make my TEG with the pairing that generated the second highest amount of electricity. The data from my experiment shows that my thermoelectric generator can generate enough electricity to charge a small battery, albeit over a long amount of time. The generator is feasible to be made out of waste materials using only bare hands. Someone who is in need of cheap electricity can make a thermoelectric generator like mine and generate electricity with only a change in temperature.

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