GENERATING THERMOELECTRICITY USING A GRAPHITE AND ALUMINUM MODULE

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Thermoelectricity generator devices can be used to convert heat energy directly to electric energy. The usage of thermoelectric devices are highly reliable as they have less maintenance and low implementation cost. These devices are also capable of recovering waste heat. Semiconductor materials are widely used to build the thermoelectric modules for various purposes. To develop semiconductor thermoelectric modules, advanced equipment and resources are needed. This study is about experimenting approaches to design and develop a small-scale thermoelectric module using low-cost materials. The experiment outcomes display that the Seebeck Coefficient plays an important role when selecting materials for the thermoelectric module. In this study, powdered graphite and aluminium foil paper were used to develop the thermoelectric module. The small-scale modules made-of graphite and aluminium strips were heated using an oil bath to gain different temperature differences, which were needed to study the variations of the generated electro motive force. This study shows that for a temperature difference around 63^0C (hot junction temperature = 114^0C and cold junction temperature = 51^0C), the generated voltage is 0.75 mV per couple. By differing the physical parameters such as width and height of the strips used, the voltage generation can be increased. Having more thermoelectric couples in a single module also results in increasing the generated voltage. Using these materials, we can develop a solution to convert solar heat to electricity without solar cells.

Keywords: Seebeck effect, Thermoelectric generator, Waste heat conservation