The Hollow Flashlights: Head and Hand

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Despite extensive development of power generation and delivery infrastructure during the past century, over 1.4 billion people around the world still do not have access to or cannot afford electricity. Clearly, this demonstrates the need for an inexpensive, easy to manufacture source of light that does not rely on conventional power sources such as batteries. The LED flashlights constructed here were unlike anything available on the market given that they utilize thermal energy produced by the human body to produce light. Two variations of flashlight were created: one powered by the heat of the hand, the second by heat emanating from the head. Both flashlights used thermoelectric generators (Peltier tiles) and simple ultra low voltage oscillators to produce over 200 micro watts of power at only a 5 degree temperature differential. When measured from a distance of 12 inches, this was enough to provide over 6 lux of light from the flashlight LED's. Both flashlight variations also have capacitors to store excess thermal energy and can provide light on-demand for over 60 minutes, without body contact. Manufacturing costs for the hand flashlight is below thirty dollars, making them an economical alternative to many battery powered flashlights currently available. In addition to providing light for those who need it the most, these flashlights are well suited for use in emergency situations. The technology itself also has potential for use in self-powered medical sensors, cell phone chargers, and other electronic devices.

Awards Won:

Second Award of $2,000