Wired on Nitinol: A Truly Green Energy Source

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Many “environmentally friendly” energy sources such as solar cells actually create toxic by-products such as lead, mercury, cadmium and arsenic during the manufacture process. A truly environmentally friendly alternative is the nitinol generator. Nitinol (a nickel-titanium alloy) creates almost no toxic by-product during manufacture, and can be used to construct a generator that can convert heat energy into electrical energy. This is possible due to the shape memory properties of nitinol. The purpose of this project was to research and design a simple nitinol generator and use it to convert heat into electrical energy. This project resulted in the development of both a single wire-loop and a dual-band nitinol generator that ran at over 540 rpm, using hot water as a heat source. When the nitinol engine was coupled to a motor, the motor generated over 50 milliwatts and 50 milliamps, enough energy to power a bright light emitting diode. The design allows for multiple nitinol wire loops to be used, thus a 20 wire loop nitinol engine of the current design would produce around one Volt and one amp. The nitinol engine works by heating the wire at one point on the small pulley using hot water or by focusing solar energy via a Fresnel lens. Nitinol engines have been demonstrated to run continuously for over a year with no degradation and have very little impact on the environment throughout their life-cycle, making them a truly green energy source.

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