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Heat flux sensors used to measure the effectiveness of a thermal diode

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Researchers at the [Hong Kong University of Science and Technology](#) used [gSKIN® Heat Flux Sensors](#) to measure the effectiveness of a thermal diode. The research was published in *The International Journal of Heat and Mass Transfer* under the title "Solid-state thermal diode with shape memory alloys"

Abstract:

Analogous to the electronic diode, a thermal diode transports heat mainly in one preferential direction rather than in the opposite direction. Phase change thermal diodes usually rectify heat transport much more effectively than solid state thermal diodes due to the latent heat phase change effect. However, they are limited by either the gravitational orientation or one dimensional configuration. On the other hand, solid state thermal diodes come in many shapes and sizes, durable, relatively easy to construct, and are simple to operate, but their diodicity (rectification coefficient) is always in the order of $g \leq 1$ or lower. Thus, it is difficult to find any potential applications. In order to be practically useful for most engineering systems, a thermal diode should exhibit a diodicity in the order of $g \geq 10$ or greater. In this study, a passive solid state thermal diode with shape memory alloy is built and investigated experimentally. The diodicity is recorded at about 90. This promising result could have important applications in the development of future thermal circuits or for thermal management.

C.Y. Tso, Christopher Y.H. Chao: Solid-state thermal diode with shape memory alloys in *The International Journal of Heat and Mass Transfer* 93 (2016) 605-611