The e-Drink: Capturing Electricity from Beverages

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A considerable amount of potential energy is lost as heat while hot beverages cool down. Until now, no effective technique of recovering this energy has been proposed. Simultaneously, there is a growing need for energy to perform daily tasks, including charging personal devices such as cell phones, tablets, and iPods. In fact, as of January 2013, 90% of American adults use cellphones. The eDrink combats both issues and provides a combined solution: it recovers a fraction of the heat from a hot beverage, stores it as electricity in an internal battery, and subsequently makes it available for charging an external personal device. The invention consists of a modified insulated mug, targeted for those who consume hot liquids during the day. The modifications exploit the temperature positioning of a thermoelectric generator and the use of a power conversion circuit to accumulate 54 Joules or more every time one uses the eDrink. This charge is used to charge a 3.7 Volt lithium battery. Daily use of the eDrink can fully charge the embedded lithium battery in around 8 - 9 days. At any point however, the mug can be connected to a personal device through its Universal Serial Bus (USB) port to transfer the charge. With the current battery, a personal device can receive a maximum boost of 0.36 Wh, which is able to extend an iPhone’s life by approximately 10 to 30 minutes. The eDrink is an effective device to innocuously store battery charge for daily use or emergencies.

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