

THERMOMAGNETIC POWER GENERATION WITH MnFe (P, Si) COMPOUNDS

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Paper deals with thermomagnetic materials with first-order phase transition. The materials can generate electric current in coil.

Keywords: generator, electric current, thermomagnetic, phase transition.

Thermomagnetic power generation is a new type of power generation which can directly convert thermal energy into electrical energy. In this abstract we will report the progress in developing thermomagnetic power generation with first-order phase transition materials MnFe(P,Si) compounds.

1. A compound of $\text{MnFe}_{0.9}\text{P}_{0.5}\text{Si}_{0.5}$ was prepared by ball-milling and solid-state reaction method. Magnetic study shows that the compound undergoes a ferromagnetic to paramagnetic transition at $T_{tr} = 330$ K with thermal hysteresis of 12 K.

2. A thermomagnetic generator machine was designed and manufactured. In this machine $N = 300$, $S = 137.5$ cm². As shown in figure 1(b), the maximum electric current generated in the coil is about 4 μA at cooling and 2 μA at warming. This study shows that the thermal magnetic power generation is possible.

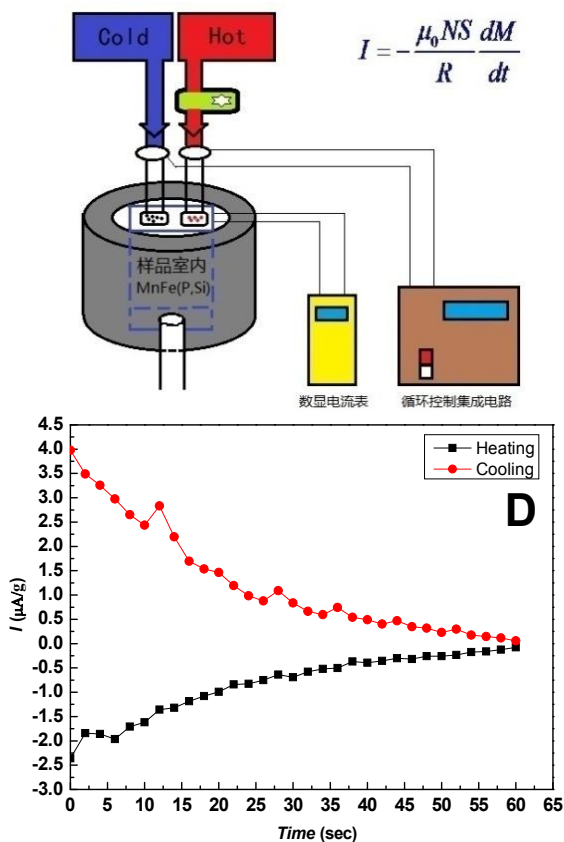


Figure 1 A schematic drawing of thermomagnetic generator (a) and induced current in the coil (b)

ТЕРМОМАГНИТНЫЕ СОЕДИНЕНИЯ С MnFe (P, Si)

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Статья посвящена исследованию термомагнитных материалов с фазовым переходом первого рода. Материалы могут генерировать электрический ток в катушке.

Ключевые слова: генератор, электрический ток, термомагнитные свойства, фазовый переход.