



US 20100044621A1

(19) **United States**

(12) **Patent Application Publication**

**Shull et al.**

(10) **Pub. No.: US 2010/0044621 A1**

(43) **Pub. Date: Feb. 25, 2010**

(54) **DOPED Gd<sub>5</sub>Ge<sub>2</sub>Si<sub>2</sub> COMPOUNDS AND METHODS FOR REDUCING HYSTERESIS LOSSES IN Gd<sub>5</sub>Ge<sub>2</sub>Si<sub>2</sub> COMPOUND**

(60) Provisional application No. 60/641,168, filed on Jan. 4, 2005.

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**Publication Classification**

(51) **Int. Cl.**  
**C09K 5/00** (2006.01)

(52) **U.S. Cl.** ..... **252/67**

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(57) **ABSTRACT**

A Gd<sub>5</sub>Ge<sub>2</sub>Si<sub>2</sub> refrigerant compound is doped or alloyed with an effective amount of silicide-forming metal element such that the magnetic hysteresis losses in the doped Gd<sub>5</sub>Ge<sub>2</sub>Si<sub>2</sub> compound are substantially reduced in comparison to the hysteresis losses of the undoped Gd<sub>5</sub>Ge<sub>2</sub>Si<sub>2</sub> compound. The hysteresis losses can be nearly eliminated by doping the Gd<sub>5</sub>Ge<sub>2</sub>Si<sub>2</sub> compound with iron, cobalt, manganese, copper, or gallium. The effective refrigeration capacities of the doped Gd<sub>5</sub>Ge<sub>2</sub>Si<sub>2</sub> compound are significantly higher than for the undoped Gd<sub>5</sub>Ge<sub>2</sub>Si<sub>2</sub> compound.

(21) Appl. No.: **12/605,464**

(22) Filed: **Oct. 26, 2009**

**Related U.S. Application Data**

(62) Division of application No. 11/262,270, filed on Oct. 27, 2005.