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hysteretic losses of the compounds $Gd_5Ge_2Si_2$ doped with the different metal additives according to the embodiments, clearly demonstrate that the alloys with the silicide-forming metal additives are significantly superior as magnetic refrigerants for near-room temperature refrigeration applications, compared to the alloy without any such metal additives. Adding a silicide-forming metal to the $Gd_5Ge_2Si_2$ compound therefore provides a magnetic refrigerant material highly suitable for near-room temperature applications.

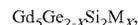
It would be reasonable to conclude that the same mechanism that gives rise to the unusually large magnetocaloric effect is also responsible for the large hysteresis losses: namely, the field-induced crystallographic phase change.

The description as set forth is not intended to be exhaustive or to limit the scope of the invention. Many modifications and variations are possible in light of the above teaching without departing from the scope of the following claims. It is contemplated that the use of the present invention can involve components having different characteristics. It is intended that the scope of the present invention be defined by the claims appended hereto, giving full cognizance to equivalents in all respects.

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The invention claimed is:

1. A magnetic refrigerant alloy of the general formula:



wherein M is a silicide-forming metal element consisting of iron (Fe) and wherein $X=0.1$ to thereby provide said magnetic refrigerant alloy having the formula $Gd_5Ge_{1.9}Si_2Fe_{0.1}$;

and wherein said alloy is homogenized by heat treatment.

2. The alloy of claim 1, wherein said alloy is heated at $1300^\circ C$.

3. The alloy of claim 2, wherein said alloy is heat treated for 1 hour.

4. A refrigerant compound comprising a $Gd_5Ge_2Si_2$ compound doped or alloyed with approximately one atomic percent of iron (Fe), wherein said iron doped $Gd_5Ge_2Si_2$ compound has the formula $Gd_5Ge_{1.9}Si_2Fe_{0.1}$ and is heat treated so as to homogenize said doped compound.

5. The refrigerant compound of claim 4, wherein said doped or alloyed $Gd_5Ge_2Si_2$ compound comprises arc melted mixtures of said iron (Fe) with said compound elements.

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