

Thermal Memory Cell

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A term “spin glass” usually denotes systems that possess two fundamental properties: frustration and randomness. These two properties lead to highly degenerate free-energy landscapes with several characteristic macroscopic magnetic properties: i) a large difference between field-cooled and zero-field-cooled magnetic susceptibilities below a freezing temperature, ii) the ZFC susceptibility exhibits a frequency-dependent cusp, iii) slow relaxation (aging) effects, and iv) a memory effect below the freezing temperature. The memory effect is observed by means of zero-field-cooled magnetization measurements with a stop during the cooling process at temperature below the freezing temperature.

The spin glass like magnetic properties in Taylor-phase complex intermetallic compound T-Al₃Mn, and its solid solutions with Pd and Fe, will be described with special emphasizes on the memory effect observed in this system.[1] We will show a new kind of memory element, a thermal memory cell, which exploit the memory effect.[2] In the thermal memory cell byte of digital information can be stored into the storage medium by pure thermal manipulation. Thermal inscription of information employs a specific temperature-time profile that involves continuous cooling and isothermal waiting time periods. We succeeded to thermally write arbitrary ASCII character into the thermal memory cell.

[1] J. Appl. Phys. **106** (2009) 043917

[2] Phys. Rev. B, **77** (2008) 064430-1