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## Estimation of magnetocaloric properties by using Monte Carlo method for AMRR cycle

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Magnetic refrigeration uses solid magnetic materials as refrigerant without global warming gas and fluorocarbon. In addition, it is expected the higher efficiency than that of vapor refrigeration system. Active Magnetic Regenerative Refrigeration (AMRR) system has demonstrated as an environmentally attractive candidate in near room temperature.

There are many studies for the magnetocaloric materials based on experimental results, however, few studies on the theoretical view, especially for the entropy property due to the magnetic interaction.

Mean field theory is commonly used to calculate the properties of magnetocaloric materials, however, it is not in good agreement with the experimental data near the magnetic transition temperature. This is one of the issues to analyze the AMRR cycle by the computer simulation.

In this study, we will take a different approach to estimate the magnetic properties more precisely by using the Monte Carlo method. We will compare the calculation results between classical mean field theory and Monte Carlo method for a typical magnetic material, and then, we will simulate the AMRR cycle by using this approach.

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