

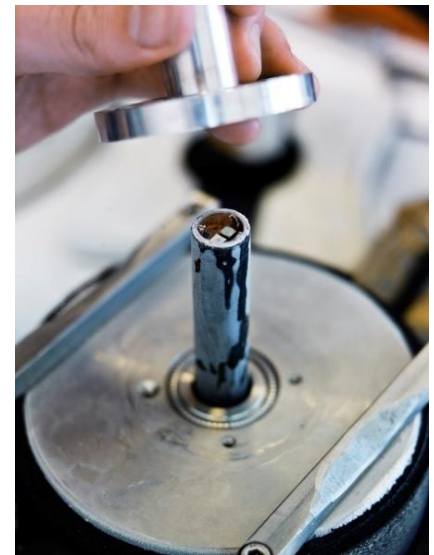
Magnetic materials for sustainable energy technologies

Magnetic refrigeration is a novel energy friendly technology. It relies on the change in temperature of certain magnetic material when they are magnetised and demagnetised. Characterisation of these so-called magnetocaloric materials will lead to a better understanding of them and improvement of the technology.

Challenge: The performance of magnetic refrigeration devices can be numerically modelled using the magnetic properties of the magnetocaloric materials as input. However, the accurate modelling requires good characterisation of the materials.

Idea: The idea is to measure the specific heat and entropy change of magnetocaloric materials while applying different magnetic fields. These measurements can then be used to get a full picture of the magnetocaloric properties of the materials, and thus be used to predict the performance in devices.

Task: You will be experimentally measuring the properties of a series of magnetocaloric materials. The measurements will be done on a custom built differential scanning calorimeter (DSC), which can be operated in different modes to measure specific heat and entropy change. The DSC is presently operational, but further instrumental development could be a part of the work if you are interested. The work can be split between experimental and numerical modelling according to your preferences.



The custom built DSC



Contact: Senior Researcher Christian Bahl (chr@dtu.dk) or Senior Researcher Kaspar Kirstein Nielsen (kaki@dtu.dk)