

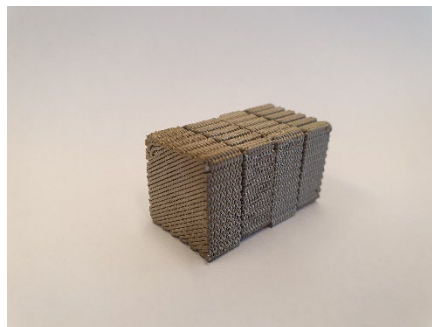
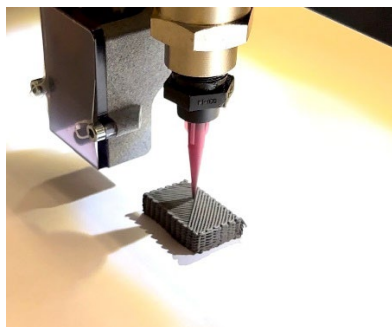
Master project: Enhancing mechanical properties of 3D-printed magnetocaloric Materials

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Introduction: In Magneto, we believe that we don't have to sacrifice our planet for our comfort or vice versa. Current heating and cooling are some of the biggest producers of greenhouse gas emissions. Our solution based on state-of-the-art magnetocaloric technology offers an alternative with zero greenhouse gas emissions and saves up to 30% of power consumption. Using cutting-edge additive manufacturing technology, we produce 3D printed materials for magnetocaloric heat pumps, which will revolutionize the cooling and heating industry and enable highly efficient, gas-free and sustainable refrigeration, air conditioning and household heating.

Goal: The goal of the proposed research is to explore state-of-the-art chemical compositions, additive manufacturing technologies and post-processing steps to fabricate highly efficient and mechanically stable 3D printed magnetocaloric materials based on MnFePSi. The research aims at improving mechanical strength of the magnetocaloric material by introducing additional elements to the base composition. The focus will be to investigate the impact of the additional element on microstructure, magnetocaloric properties as well as mechanical strength of the magnetocaloric material and 3D printed block.



3D printed magnetocaloric material (left, middle) and magnetocaloric heat pump (right)

Tasks:

1. Study the impact of different chemical compositions and concentrations of the additional element on the material's crystal lattice and microstructure.
2. Optimization of the chemical composition to enhance mechanical properties and durability of the 3D printed blocks.
3. Characterization of magnetic and thermal properties of the magnetocaloric material as well as testing mechanical strength and durability of 3D printed blocks.

Your profile: We are searching for a creative, curious and responsible Student from the MSc Applied Science, Materials Science & Engineering or related fields (Mechanical engineering, Manufacturing engineering, chemical engineering).

Knowledge in material characterization, manufacturing technologies, post-processing and heat treatments. Able to perform deep-dive into literature research and filter the relevant parameters.

Sounds like a great opportunity? Get in touch with us!