Internship: Investigation of coatings to enhance mechanical stability of 3D-printed magnetocaloric Materials

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Introduction: At Magneto, we believe that we don't have to sacrifice our planet for our comfort or vice versa. Traditional heating and cooling methods are major contributors to greenhouse gas emissions. Our technology provides a sustainable alternative for cooling and heating appliances, as well as waste heat to power conversion. With zero greenhouse gas emissions, no toxic refrigerants, up to 30% higher energy efficiency, and lower ownership costs, we're shaping a greener and more efficient tomorrow. 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. Website: https://magneto.systems

Goal: The proposed study aims to build highly effective and structurally robust 3D-printed magnetocaloric materials based on MnFePSi by investigating cutting-edge chemical compositions, additive manufacturing techniques, and post-processing procedures. **Enhancing the mechanical stability** of 3D-printed blocks through the **investigation of sophisticated coating** processes is the primary focus of the research. The project will assess how coatings and heat treatment affect the magnetocaloric materials and 3D-printed blocks' mechanical strength, microstructure, and magnetocaloric properties.

3D printed magnetocaloric material (middle) and high-temperature laboratory furnace (right)

Tasks:

1. Optimization of coatings and their effect on the mechanical and magnetocaloric properties of 3D-printed magnetocaloric materials
2. Investigation of the interaction between coatings and heat treatment parameters to enhance the stability and performance of magnetocaloric materials
3. Characterization of magnetic and thermal properties as well as microstructure and grain size of 3D printed magnetocaloric materials.

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!