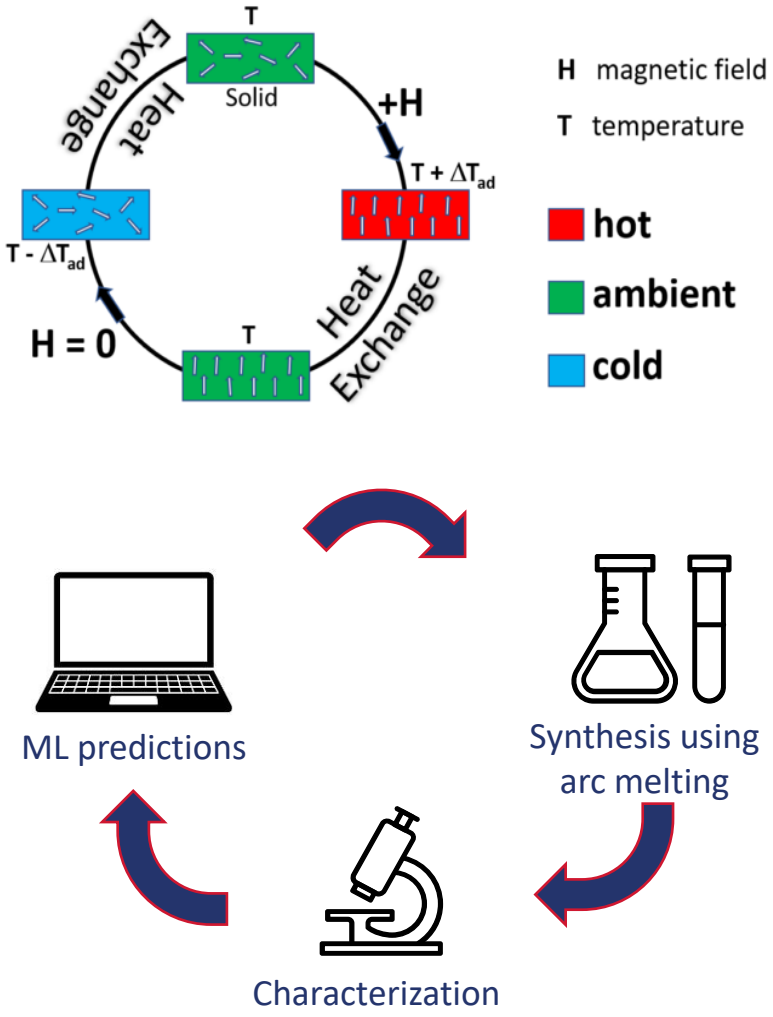
Magnetocaloric Hydrogen Liquefaction

Introduction

Conventional refrigeration uses vapor compression-expansion technology, which suffers high cost, high complexity, and energy inefficiency as one approaches the liquefaction point of hydrogen (-253 °C).

Magnetocaloric hydrogen liquefaction (MCHL) is a promising alternative, utilizing the heating and cooling of specific materials upon undergoing magnetization and demagnetization, respectively. The largest MCE occurs at the magnetic transition temperature of the material.

Theory and Method:



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Related projects: LIQUID-H "Hydrogen Liquefaction with Caloric Materials"

Master's degree in Nanotechnology with a specialization in Nanotechnology for Materials, Energy and the Environment from NTNU (2018-2023).

PhD candidate at the Department for Hydrogen Technology at IFE (2023-2026).

Estimated progress of the PhD project:

Just started ...	< 50 %	> 50 %	Almost done ☺

Primary objective

- Develop magnetocaloric materials for hydrogen liquefaction

Secondary objectives

- Reduce the critical raw material content (>50%)
- Use machine learning to predict the magnetic transition temperature for new materials

Norwegian Research School on Hydrogen and Hydrogen-Based Fuels

Institute for Energy Technology

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