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C2Po3C-04: Small Scale Joule Thomson Hydrogen Liquefaction –A Comparison of Two Liquefaction Cycles

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With the growing demand for green energy, hydrogen (H2) and liquid hydrogen (LH2) are gaining attention from the industry and research. A critical challenge arises in the supply of LH2, as industrial gas suppliers typically do not deliver small quantities. Consequently, several cubic metres of LH2 must be bought and stored even for small-scale tests. A need for small scale liquefiers with approximately 10 to several hundred litres per hour was identified, in order to accumulate limited LH2 quantities for laboratory purposes. To address this issue, the development of small liquefaction plants is a possible solution. A focus is put on simple and readily available components, as well as the possibility of a quick realization. Two possible liquefaction cycles based on Joule Thomson expansion are presented and compared by relevant performance indicators such as efficiency and complexity.

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