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M3Or1A-01: Cryogenic Hydrogen and testing methods: microstructural and mechanical properties under cryogenic hydrogen environment

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Hydrogen is seen as a key energy carrier for a future CO₂-neutral society. The high energy density of liquid hydrogen (LH₂) is advantageous for transport and for a number of applications, especially in the mobility sector. Within the framework of the national hydrogen lead projects of the BMBF [1], KIT [2] is working with project partners of the technology platform “TransHyDE” in the lead project “AppLHy!” on the transport and application of liquid hydrogen. Therefore, the characterization of materials under cryogenic and liquid hydrogen conditions is needed in terms of interaction and possible degradation. Within this contribution different material-testing devices will be presented, such as a pre-charging device, operating at various H₂-pressures and different temperatures. An in-situ charging device as well as mechanical testing machines operating from room temperature to 20 K will be also presented [3]. Moreover, the contribution will also show the H amount measurements after charging at several conditions.

[1] <https://www.wasserstoff-leitprojekte.de/>

[2] https://www.kit.edu/kit/pi_2021_078_wasserstofftechnologien-kit-forscht-in-allen-drei-leitprojekten-des-bundes.php

[3] <https://www.itep.kit.edu/148.php>

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