

## Density Measurements of Hydrogen-Isobutane and Hydrogen-Pentane Mixtures

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To target gas grid decarbonisation and carbon capture and storage, accurate thermophysical properties models are needed to ensure the efficiency of the involved processes. These are the goals of the EMPIR project “Metrology for Decarbonising the Gas Grid” (20IND10 Decarb). In particular, measurements of density are needed to review the standard equations of state for custody transfer with a hydrogen content higher than 10 %.

In this work, experimental densities of hydrogen-isobutane ( $\text{H}_2 + \text{iC}_4\text{H}_{10}$ , 90/10 mol %) and hydrogen-pentane ( $\text{H}_2 + \text{C}_5\text{H}_{12}$ , 90/10 mol %) are discussed. A vibrating tube densimeter, characterized by using helium and vacuum as reference fluids, has been exploited to measure the density of the gas mixture. The density has been obtained in the temperature range from 263 K to 333 K and at pressure up to 4 MPa, with a relative expanded uncertainty lower than 0.1 %.