

Experimental Determination of the Density of Two Synthetic Natural Gas Type Mixtures

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Experimental characterization of the thermodynamic behavior of multicomponent gas mixtures of accurately known composition is of great importance for testing the current reference equation of state for natural gases and related mixtures, GERG-2008. Natural gas composition may change considerably due to the diversity of origins, or the possibility to incorporate hydrogen, biogas or other non-conventional energy gases. In this work density measurements for a synthetic hydrogen-enriched natural gas mixture (13 components, $x_{H_2} = 0.03$) and for a synthetic natural gas with a composition similar to a typical liquefied natural gas (9 components), are presented. Both mixtures were prepared gravimetrically. Accurate density measurements are performed at temperatures between 250 K and 400 K, and pressures up to 20 MPa, using a single sinker densimeter with magnetic suspension coupling, which is one of the state of the art methods for density determination over wide ranges of temperature and pressure.