With experimental activities and theoretical work, a property model shall be developed that ensures static and dynamic simulations of pipeline networks and (stationary and mobile) gas storages with uncertainties that are nowadays common for the management of natural gas.

The experimental equipment at the chair of thermodynamics at Ruhr University Bochum provides several apparatuses and systems (Single- and Two-Sinker Densimeter, Speri-cal Resonator ...) for the measurement of thermophysical properties, such as density or speed of sound.

On the basis of the gained \((p,p,T,x)\)- and \((p,c,T,x)\)-data sets for binary gas mixtures with higher \(H_2\)-fractions, weaknesses of the previously used property standard can be identified and improved.
Experimental work

Density measurements
- Measurement of various binary, hydrogen-rich gas mixtures, using a Single-Sinker Densimeter in the temperature range from 253 to 453 K with pressures up to 20 MPa
- Validation of the results by repeating measurements at selected state points with a Two-Sinker Densimeter

Speed-of-Sound measurements
- Measurement of various binary hydrogen-rich gas mixtures, using an optimised Spherical Resonator in the temperature range from 300 to 350 K and pressures up to 8 MPa

Theoretical work

Property modeling
- Validation of the property model GERG-2008 on the basis of the experimental work and of a comprehensive literature search (identification of the binary sub-systems relevant for improvement)
- Development of new equations of state for hydrogen-rich natural gas mixtures considering all available experimental data
- Integration of the new equations of state into the property model GERG-2008 which is accepted as an international standard
- Implementation of the improved property model in the existing software TREND and REFPROP

Your benefit

Determination of properties for all kinds of simulations
- The applicability of the algorithms for the established property model GERG-2008 is maintained by integrating the improved equations of state
- Consistent calculation of all thermodynamic properties for relevant hydrogen concentrations in a wide pressure and temperature range for static and dynamic simulations
- Implementation of the new property model in existing software enables compatibility with widely-used simulation tools such as ASPEN Plus or EBSILON Professional

Further information
www.dynaflex.de

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