## Development of a Special Densimeter for the Investigation of Sorption Phenomena Near Dew Points of Fluid Mixtures

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Considering that the dew-point density of a fluid mixture is essential for further improvements of accurate mixture models, a significant need for further research arises. Utilizing the two-sinker density measurement principle corrects adsorption to first order but does not compensate for changes in composition due to sorption phenomena when measuring mixture properties. Therefore, a better understanding of sorption phenomena is required to obtain the goal of accurately measuring dew-point densities of gas mixtures. In this context, it is not only desirable to understand the influence of sorption phenomena close to the dew line but also in the homogeneous gas phase. We have demonstrated in previous studies that a two-sinker densimeter can either be used to accurately measure vapor-phase densities or as a dew-point instrument. In consequence, a new experimental technique, which overcomes the difficulties in existing techniques, is needed. As the result of a detailed study, a four-sinker densimeter has been designed. It is a hybrid of the well-established two-sinker density measurement principle and the application of two sorption sinkers that allow for a quantitative determination of the mass of sample adsorbed onto the sinker's surfaces. At the same time, densities can be measured accurately and sorption phenomena can be investigated. We will present the design of the new densimeter, which is currently under construction. This instrument will enable measurements over the temperature range from (190 to 470) K at pressures up to 20 MPa.