Accurate Measurements of Carbon Dioxide and Sulfur Dioxide (CO₂+ SO₂) Vapor-Liquid Equilibria

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In order to avoid the costly impacts of unchecked global warming, most international studies agree that large-scale CO₂ capture, transport and storage (CCS) have to be part of the solution to reduce and even reverse anthropogenic emissions of CO₂. Numerous studies by e.g. IEA and IPCC have shown that an efficient mitigation of global warming probably will include large-scale CCS. A number of full-scale CCS projects are currently underway, but it is clear that further optimization of CCS unit operations, processes and systems is needed to accelerate deployment of CCS world-wide to lower cost and improve safety. Such an optimization requires improved knowledge of relevant fluid properties.

 SO_2 is a potential important impurity in CCS. Depending on the source and process it could exist in concentrations up to ~1 % after capture and before further purification. Some authors have argued that SO_2 could enhance CO_2 storage through a reduction in Joule-Thomson effect and increase in density, but it is clear that the SO_2 's toxicity and corrosion potential with water mean that it is of paramount importance for operators to understand the phase behavior of CO_2 +SO₂. Currently, only one modern dataset with two isotherms exists for this system. Hence, new phase equilibrium measurements have been performed using SINTEF's accurate phase equilibrium facility CO_2Mix . In the conference, the results of this campaign and the measures undertaken to handle SO_2 in the lab will be presented.

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