

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

Sigurd Weidemann Løvseth^{C, S}, Hans Georg Jacob Stang and Martin Viktor Johansson
SINTEF Energy Research, 7465 Trondheim, Norway
sigurd.w.loevseth@sintef.no

Martin Khamphasith and Eric F. May
University of Western Australia, 35 Stirling Highway, WA, Australia

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.

SO₂ 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 SO₂ could enhance CO₂ storage through a reduction in Joule-Thomson effect and increase in density, but it is clear that the SO₂'s toxicity and corrosion potential with water mean that it is of paramount importance for operators to understand the phase behavior of CO₂+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 CO₂Mix. In the conference, the results of this campaign and the measures undertaken to handle SO₂ in the lab will be presented.

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