

## Accurate Vapor-Liquid Phase Equilibrium Measurements on the Binary CO<sub>2</sub>-O<sub>2</sub> System

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Accurate vapor-liquid phase equilibrium measurements are performed on the binary CO<sub>2</sub>-O<sub>2</sub> system using a setup specifically designed for CO<sub>2</sub>-rich mixtures and conditions relevant for CCS transport and conditioning employing an analytical technique. Preliminary experiments show that the measurements can be done with low standard (k=1) uncertainty, within 10 mK in temperature, 0.05 percent in pressure, and 0.1 percentage-points in composition. The setup has been specifically designed to compensate for pressure drops caused by removal of a composition sample from the equilibrium cell, enabling the possibility of several composition samples at the same pressure close to the critical point at a certain temperature. According to recently reported comprehensive literature studies, experimental vapor-liquid equilibrium data for this system are scarce, and of varying quality. For instance, some of the seemingly most accurate available vapor-liquid equilibrium data for the CO<sub>2</sub>-O<sub>2</sub> system are not consistent with the vapor pressure of pure CO<sub>2</sub>, hence indicating an error in the pressure measurements of these data. The objectives of the current measurements are to reconcile the inconsistencies in the available literature data and to otherwise cover gaps in the available data including states close to critical conditions and temperatures above 273.15 K, where little data of sufficient quality exists. Measurements will be reported for several isotherms from 223.15 K up to close to the critical temperature of CO<sub>2</sub>, with the possibility of carrying out experiments at pressures from 0.4 MPa to 20 MPa, and comparison with existing data and models will be provided.