Determination of the Interfacial Dynamic Tension of the Systems CO_2 – Decane, CO_2-Dodecane, and H_2O-Dodecane to High Pressures with T = 20, 30, 40, and 50 °C

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Interfacial or superficial tension plays an important role in the modeling and design of extraction, cleaning, or emulsification processes. For instance, in the processes of extraction and cleaning, the main factors that determine the efficiency of the mass transference are the number of interactions between the molecules in the interface and the drop size, which is strongly dependent on the interfacial tension between two phases, which reflects the cohesion and interaction of their forces [1]. These forces are affected by the pressure and temperature of the system, decreasing, in this way, the value of the above-mentioned tension. High-pressure interfacial and surface-tension phenomena govern the migration and recovery of oil and gas from hydrocarbon reservoirs. The phenomena are of particular relevance to phase separation and mass transfer in light hydrocarbon fractionation plants [2].

In this work, the variation of the superficial and interfacial tensions with regard to the time by means of the pendant drop method [5] to high pressures with temperatures of 20, 30, 40, and 50 °C was used to describe the isothermal absorption in the systems CO_2-H_2O (which was calibrated in the experimental setup [1 - 4]), CO_2-Decane, CO_2-Dodecane, H_2O-Dodecane. The objective was to analyze the decrease of the above-mentioned tension that has been used in the methods of improved recovery of oil [6], giving tension results with a minor mistake to 5 %.

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