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ANALYSIS AND MODELLING OF THE SOLUBILITY OF BIOGAS COMPONENTS IN WATER FOR PHYSICAL ABSORPTION PROCESSES

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Abstract

Biogas can be used as a renewable and green energy source by upgrading to natural gas. Water scrubbing, which is one of the most widely-applied upgrading technologies, involves an accurate knowledge of the solubility of the main biogas components in water, which is essential to the design and optimization of the biogas upgrading process.

In this work, we use several thermodynamic models available in the Aspen Plus software modeling environment to calculate the solubility of the main biogas components (CO_2 , CH_4 , H_2S , N_2 , O_2) in water, considering physical absorption processes. Our modeling results are then compared with experimental data from the related literature, and the most suitable thermodynamic model is thus determined. Such an appropriately-selected model can then be efficiently applied for further analyses, such as the simulation of the water scrubbing process.

Key words: activity coefficient methods, gas solubility, Henry's law, thermodynamic model, water scrubbing process

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