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Updated Review on the Available Methods for Measurement and Prediction of the Mass Transfer Coefficients in Bubble Columns

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This review summarizes the most important measurement techniques for determination of the volumetric liquid-phase mass transfer coefficient kLa. In addition, the main empirical correlations (with their applicability ranges) for kLa estimation are presented. It is clearly underlined that in tall bubble columns, a system of two differential equations (involving the gas and liquid axial dispersion coefficients) should be solved in order to obtain the accurate kLa value. The semi-empirical correlations for kLa prediction based on the correction of the penetration theory are also summarized. The need for a correction of the penetration theory is explained. The different definitions of the gas–liquid contact time, including the one based on the local isotropic turbulence theory, are presented. Finally, the various chemical methods for the determination of the gas–liquid interfacial area are summarized. Additionally, the main correlation for the prediction of the interfacial area is reported. The effects of pressure, temperature, and viscosity on the interfacial area and kLa are discussed.

Metryczka

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