

Determination of dynamic interfacial tension in a pulsed column under mass transfer condition

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Abstract

Interfacial tension is an essential physical property in two phase flow and it changes due to the mass transfer. The measurement of dynamic interfacial tension (DIFT) in such condition is a difficult problem. In previous study (Zhou et al., Chem Eng Sci. 2019; 197:172-183), we presented the quantitative relation between the droplet breakup frequency function (DBFF) and interfacial tension. It is found that the DBFF is highly depends on interfacial tension. Therefore the DBFF is a suitable parameter to quantitatively characterize the interfacial tension. Based on this concept, the DIFT in the column is determined by regression method after the DBFF under mass transfer condition is measured. It is found that the DIFT is smaller than the static interfacial tension. This result indicates that interphase mass transfer leads to decreasing of the interfacial tension. The decreasing extent of the DIFT has a positive correlation with the mass transfer flux.

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