Institute of Chemical Engineering

Adres artykułu: https://iich.gliwice.pl/en/article/development-of-novel-identification-methods-and-preparation-of-new-flow-regime-maps-in-bubble-columns-operated-with-electrolytes-dilute-alcoholic-solutions-surfactants-and-ionic-liquids

Development of novel identification methods and preparation of new flow regime maps in bubble columns operated with electrolytes, dilute alcoholic solutions, surfactants and ionic liquids

Duration: 2021 - 2024
Description

Research Group Linkage Programme 3.4 - 1117626-POL-IP

The main goal of this project is to develop novel identification methods and new flow regime maps in different bubble columns operated not only with electrolytes (salts) and dilute alcoholic solutions but also with ionic liquids and surfactants. In the past two decades huge number of ionic liquids have been developed and most of them have never been used in bubble columns. In the literature hitherto there is only a simple flow regime map valid for air-water system (Shah et al., 1982). For the preparation of the modern flow regime map new sophisticated identification methods (degree of randomness, information entropy (type 1 and 2) and reconstruction entropy) will be applied to pressure fluctuations, gas holdup fluctuations recorded by wire-mesh sensor and X-ray scans and temperature fluctuations. These methods depend on several parameters and their influence on the transition velocities will be investigated. The calculation of the new identification parameters will be based on signal reconstruction techniques from the nonlinear chaos analysis. The bubble columns will be equipped with different perforated plate gas distributors. The effects of both the clear liquid height and column diameter on the main transition velocities will also be investigated. The identification results based on the new parameters will be compared with the results based on both Kolmogorov and modified Shannon entropies. The new flow regime maps will enable the researchers to identify reliably each main regime transition velocity and this will be very useful for the development of a new successful bubble column scale-up methodology. In addition, new empirical correlations for prediction of the main transition velocities will be developed.

Metryczka

Published by:	Artur Wojdyła
Published at:	29.07.2025 13:39
Number of views:	70