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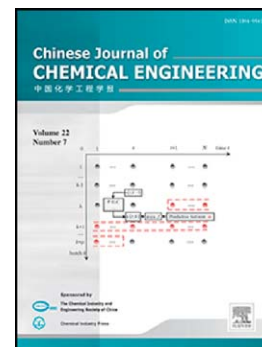
Breakage of drops and bubbles in a stirred tank: A review of experimental studies

Basim O. Hasan

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## Fluid Dynamics and Transport Phenomena

### Breakage of drops and bubbles in a stirred tank: A review of experimental studies

Basim O. Hasan<sup>a,b</sup>

<sup>a</sup>Department of Chemical Engineering, Technical University of Berlin, Germany

<sup>b</sup>Department of Chemical Engineering, Al-Nahrain University, Iraq  
Email: basimohasan13@gmail.com

#### Abstract

The rate of breakage of drops and bubbles (fluid particles) in stirred systems are of great consequences on mass, heat, and momentum transport phenomena. Therefore, over the years, the topic has gained a considerable attention from the researchers to study and characterize this phenomenon. In present work, the experimental studies of breakage phenomenon in a stirred tank in the last four decades were reviewed. The review highlighted the investigated experimental conditions and the major findings concerning the breakage mechanism and the effect of operating conditions. The discrepancy and contradictions of the outcomes of those studies were specified and discussed. Experimental observations and conclusions concerning the breakage characterization parameters, such as deformation, breakage probability, breakage time, and breakage location were presented and commented on. Possible future refinements and prospective were recommended. The review indicated that there are clear discrepancies and contradictions between previous studies regarding the effect of some operating parameters and the values of breakage time, breakage probability, number of daughter particles, and breakage location relative to the impeller. In addition, there are still many scientific gaps need to be studied and characterized in future by overcoming specific experimental difficulties and uncertainties.

**Keywords:** drop, bubble, breakage, stirred tank, review, breakage rate.

#### 1. Introduction

Stirred gas -liquid or liquid -liquid dispersions are of a practical significance in many industrial processes. The phenomenon of drop or bubble breakage is encountered in a variety

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