

Lecture in CSM:

Collisions of Liquid Drops for Encapsulation

Univ.-Prof. Dr.-Ing. habil. Günter BRENN

Institute of Fluid Mechanics and Heat Transfer, Graz University of Technology,
Austria

ABSTRACT

Collisions of liquid drops are an elementary process in two-phase flows with a dispersed liquid phase in a gaseous ambient medium. Drop collisions are particularly frequent in dense sprays with high relative velocities between the droplets. The collisions (may) influence the size spectra of the sprays, together with the drop velocities, and, therefore, the transport processes between the liquid and the gaseous phases.

This seminar talk gives an overview of the processes observed in binary and ternary drop collisions. We discuss in detail the cases of binary and ternary drop collisions with the coalescence and breakup processes after the impact. The aim is to find scaling laws for predicting the onset conditions of unstable mechanisms, such as separation of the drops. This investigation is useful in view of the fact that colliding drops may serve as micro-reactors to produce encapsulated states, e.g., of an aqueous drop inside a polymerized oil shell. An application may be the production of dry emulsions or the encapsulation of thermally or chemically delicate products.