

# Hydrodynamic Instabilities Driven by Transient Interfacial Tension in a Neutralization Reaction

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This article is devoted to the experimental investigation of hydrodynamics instabilities at the interface in an immiscible liquid-liquid system, where n-propanoic acid in organic solution diffuses through the interface to react with potassium hydroxide in aqueous solution. The surface tension of the binary solutions, which is dependent on the solute concentration, changes with progress of the reaction, leading to instabilities in the system. The reacting system is confined in a Hele-Shaw cell, which contains two transparent quartz glass plates with a PTFE foil of a certain shape and thickness between them. The interface deformation and the convection patterns along the interface are observed spatio-temporally by a high-resolution shadowgraph system with a CCD camera. We explore the characteristic of the system by changing the material properties, such as the acid concentration, the base concentration and the acid to base concentration ratio, as well as the thickness of the PTFE foil. Synthesis of the experimental results suggests the relation between the material properties and the hydrodynamics instabilities within the system.