Tokyo University of Agriculture and Technology
Institute of Global Innovation Research

グローバルイノベーション研究院　公開セミナー
Institute of Global Innovation Research Open Seminar

Dynamics of microdroplets in multicomponent liquids

Dr. Xuehua Zhang

Professor,
Department of Chemical and Materials Engineering ,
University of Alberta, Canada

言語 / 英語　Language / English

Thursday, December 19 2019, 13:00 ~ 14:00

東京農工大学 小金井キャンパス　13号館　講義室 L1331
Lecture Room L1331, Building 13, Koganei Campus TUAT

Abstract

Phase separation induced by solvent addition is ubiquitous in many technologic and industrial processes, from preparation of pharmaceutical products, to formulation of cosmetics and insecticides, to liquid–liquid microextraction. The new microscopic phase formation induced by solvent addition takes place under the conditions far out-of-equilibrium. The growth dynamics of individual domains is determined not only by the concentration of compositions (thermodynamic aspects), but also by the temporal and spatial characteristics of the mixing process of the solvents (dynamic aspects). We have experimentally and theoretically investigated the effects from the mixing dynamics on the droplet formation under controlled flow conditions. A universal femtoliter droplet-based platform is developed for determination of partition coefficient in water and oil phases and for fast and sensitive nanoextraction of trace of hydrophobic compounds in aqueous solutions. We further revealed the droplet formation from liquid-liquid phase separation in a quasi-2D chamber. Remarkably, the droplets exhibit significantly enhanced the mass transfer in confined spaces. This finding may of relevance to the interfacial process during oil extraction from underground by a displacing fluid.

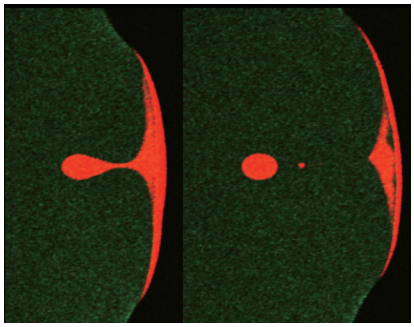

Figure 1. Splitting droplet at four-phase contact line of solid-air-oil-water. The snapshots show an intriguing phenomenon that follows after the four phases oil (red), water (green), solid and gas make contact through the coalescence of two different three-phase contact lines. (Yu et al, Soft Matter 2019)

どなたでも、ご聴講いただけます。
Everyone is welcome to attend.

■共催 / Co-Organized by

グローバルイノベーション研究院 ライフサイエンス分野　田川チーム
Institute of Global Innovation "Life Science" TagawaTeam

卓越大学院プログラム
Excellent Leader Development for Super Smart Society
by New Industry Creation and Diversity

WISE-TUAT

■お問合せ先／Contact

グローバルイノベーション研究院　工学研究院　田川義之
Institute of Global Innovation Research, Institute of Engineering,
Assoc. Prof. Yoshiyuki Tagawa
Email: tagawayo (ここに@を入れてください) cc.tuat.ac.jp

Merry Christmas

詳細はホームページをご覧ください
Please refer to our website for more information

URL: https://www.tuat-global.jp
https://www.tuat-global.jp/english/