JASMAC
Conference of the Japan Society of Microgravity Appllication
JASMA

0705

『メニスカス・ポンプ』機構を利用した動的濡れ制御
Control of Dynamic Wetting by "Meniscus Pump"

上野一郎 [1], Lizhong MU[2], Harunori N. YOSHIKAWA[3], Farzam ZOUESHTIAGH[4], Georg DIETZE[5], 中村颯 [6], 小川哲也 [6], 近藤大地 [6], 堀琢磨 [7]

Ichiro UENO[1], Lizhong MU[2], Harunori N. YOSHIKAWA[3], Farzam ZOUESHTIAGH [4], Georg DIETZE[5], Hayate NAKAMURA[6], Tetsuya OGAWA[6], Daichi KONDO[6], Takuma HORI[7]

1 東理大, Tokyo Univ. Science
2 大連工科大, Dalian Univ. Technology
3 Univ. Côte d'Azur
4 Univ. Lille
5 Univ. Paris-Sud/CNRS
6 東理大院, Tokyo Univ. Science
7 東京農工大, Tokyo Univ. Agri. Tech.

It has been found that a local acceleration of three-phase boundary line, or so-called contact line, of a droplet is induced by interaction with small obstacle settled on the substrate [1-4] as shown in **Fig. 1**. Heterogeneous meniscus formation around the obstacle results in pressure gradient to drive the liquid forward due to the curvature of the liquid profile. It has been also indicated that successive interactions between the contact line and the multiple obstacles realize more effective liquid transport [3,4]. Such acceleration is found to be achieved without any mechanical energy input or mechanical pump, so that such "meniscus pump" is a potential phenomenon to be applied to micro-TAS devices and environmental control systems in microgravity facilities and so on. We will briefly introduce the mechanism of this pumping effect by the meniscus investigated with experimental and numerical approaches.

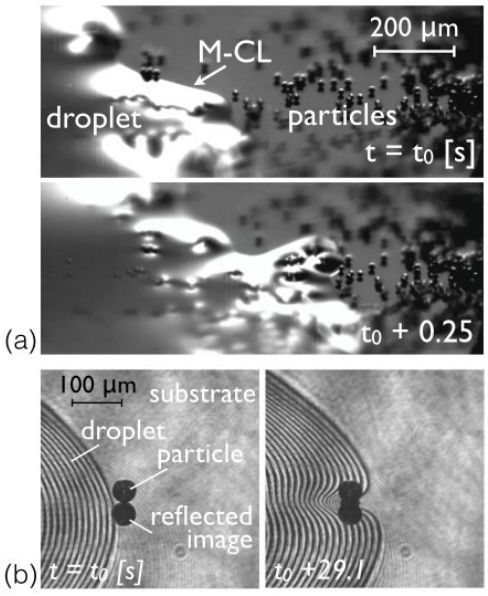

Fig. 1 Examples of local acceleration of contact line of a droplet spreading on a smooth substrate due to interaction with tiny obstacles; (a) successive interactions with multiple particles and (b) deformation of contact line due to interaction with a spherical particle of 50×10^{-6} m in diameter obtained via interferometer.

References

1) L. Mu, D. Kondo, M. Inoue, T. Kaneko, H.N. Yoshikawa, F. Zoueshtiagh and I. Ueno: J. Fluid Mech., 830 (2017) R1.

2) D. Kondo, L. Mu, F. de Miollis, T. Ogawa, M. Inoue, T. Kaneko, T. Tsukahara, H.N. Yoshikawa, F. Zoueshtiagh and I. Ueno: Int. J. Microgravity Sci. Appl., 34 (2017) 340405.

3) L. Mu, H.N. Yoshikawa, D. Kondo, T. Ogawa, M. Kiriki, F. Zoueshtiagh, M. Motosuke, T. Kaneko and I. Ueno: Colloids and Surfaces A, 555 (2018) 615.

4) L. Mu, H.N. Yoshikawa, F. Zoueshtiagh, T. Ogawa, M. Motosuke and I. Ueno: Langmuir 35 (2019) 9139.

注意：この原稿は昨年のものを見本用として使用いたしております。

＊テンプレートを必ずご利用ください。（英語原稿）

＊ページ数に上限はありません。

＊発表番号は事務局が入力いたします。

＊メール添付にて、事務局より受け取った「ID 番号」を件名に付けて、「Microsoft Word」と「PDF」の２つのファイルの ご提出をお願いいたします。

＊ポスターセッション、OS、一般講演全て同じものをご利用ください。