Supplementary Information

Oscillatory motion of a self-propelled object determined by the mass transport path

Masakazu Kuze,[1,2] Nozomi Kawai,[1] Muneyuki Matsuo,[1,3] Istvan Lagzi[4,5], Nobuhiko J. Suematsu[2,6], and Satoshi Nakata[1,*]

1. *Graduate School of Integrated Sciences for Life, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima-shi, Hiroshima 739-8526, Japan*

2. *Meiji Institute for Advanced Study of Mathematical Sciences (MIMS), Meiji University, 4-21-1 Nakano, Nakano-ku, Tokyo 164-8525, Japan*

3. *Graduate School of Arts and Sciences, The University of Tokyo, 3-8-1 Komaba, Meguro-ku, Tokyo 153-8902, Japan*

4. *Department of Physics, Institute of Physics, Budapest University of Technology and Economics, Muegyetem rkp. 3., Budapest H-1111, Hungary*

5. *HUN-REN-BME Condensed Matter Physics Research Group, Budapest University of Technology and Economics, Muegyetem rkp. 3., Budapest H-1111, Hungary*

6. *Graduate School of Advanced Mathematical Sciences, Meiji University, 4-21-1 Nakano, Nakano-ku, Tokyo 164-8525, Japan*

*To whom correspondence should be addressed. E-mail: nakatas@hiroshima-u.ac.jp

1. Movie of Fig. 1

Movie S1: The oscillatory motion of the self-propelled camphor object (SPC) at $T_r = 280$ K and $\Delta T = 0$ K in Experiment I (Top view, 800 times speed, AVI)

Movie S2: The oscillatory motion of the SPC at $T_r = 286$ K and $\Delta T = 0$ K in Experiment I (Top view, 800 times speed, AVI)

Movie S3: The oscillatory motion of the SPC at $T_r = 293$ K and $\Delta T = 0$ K in Experiment I (Top view, 50 times speed, AVI)

Movie S4: The oscillatory motion of the SPC at $T_b = 286$ K ($\Delta T = 6$ K) in Experiment II (Top view, 50 times speed, AVI)

Movie S5: The oscillatory motion of the SPC at $T_b = 293$ K ($\Delta T = 13$ K) in Experiment II (Top view, 50 times speed, AVI)

2. Movie of Fig. 3

Movie S6: Visualization of the mass transport of camphor molecules at $T_r = 280$ K and $\Delta T = 0$ K in Experiment I (Side view, 100 times speed, AVI)

Movie S7: Visualization of the mass transport of camphor molecules at $T_r = 286$ K and $\Delta T = 0$ K in Experiment I (Side view, 30 times speed, AVI)

Movie S8: Visualization of the mass transport of camphor molecules at $T_r = 293$ K and $\Delta T = 0$ K in Experiment I (Side view, 10 times speed, AVI)

Movie S9: Visualization of the mass transport of camphor molecules at $T_b = 286$ K ($\Delta T = 6$ K) in Experiment II (Side view, 20 times speed, AVI)

Movie S10: Visualization of the mass transport of camphor molecules at $T_b = 293$ K ($\Delta T = 13$ K) in Experiment II (Side view, 10 times speed, AVI)