



Supporting Information

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High-Motility Visible Light-Driven Ag/AgCl Janus
Micromotors

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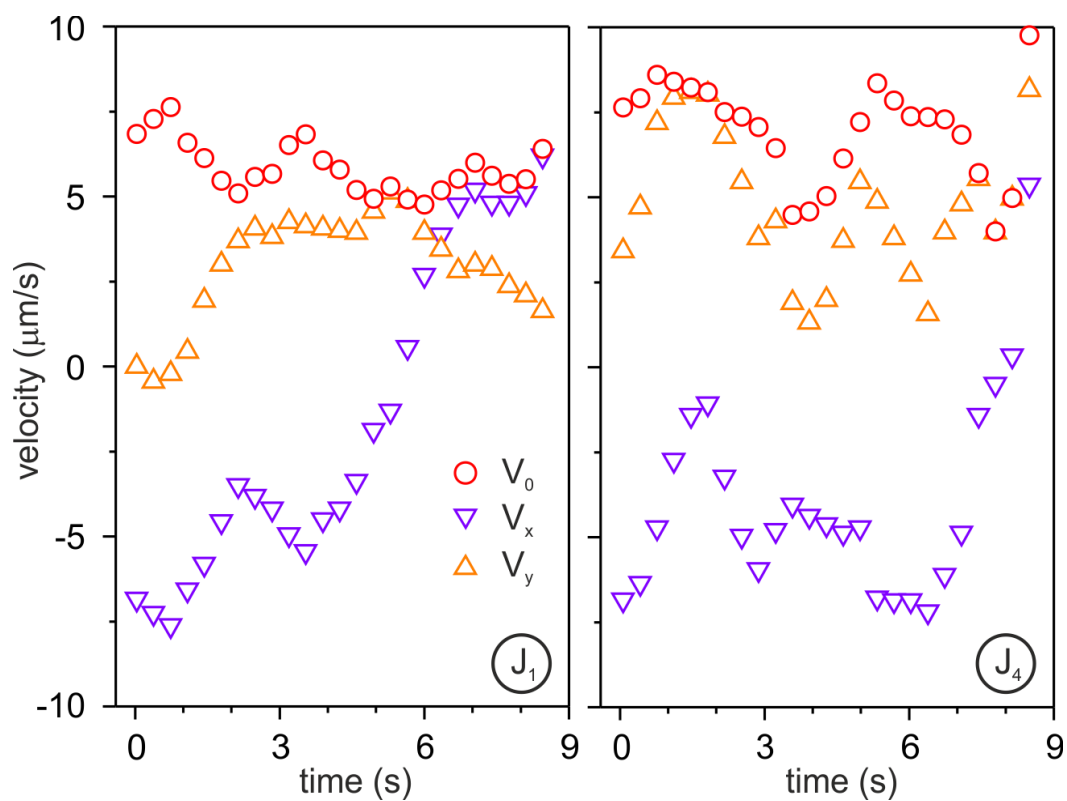


Figure S1. Instantaneous velocity of single Janus PS/Ag/AgCl particles (particles J_1 and J_4 from Figure 3 of the main text) (video S1).

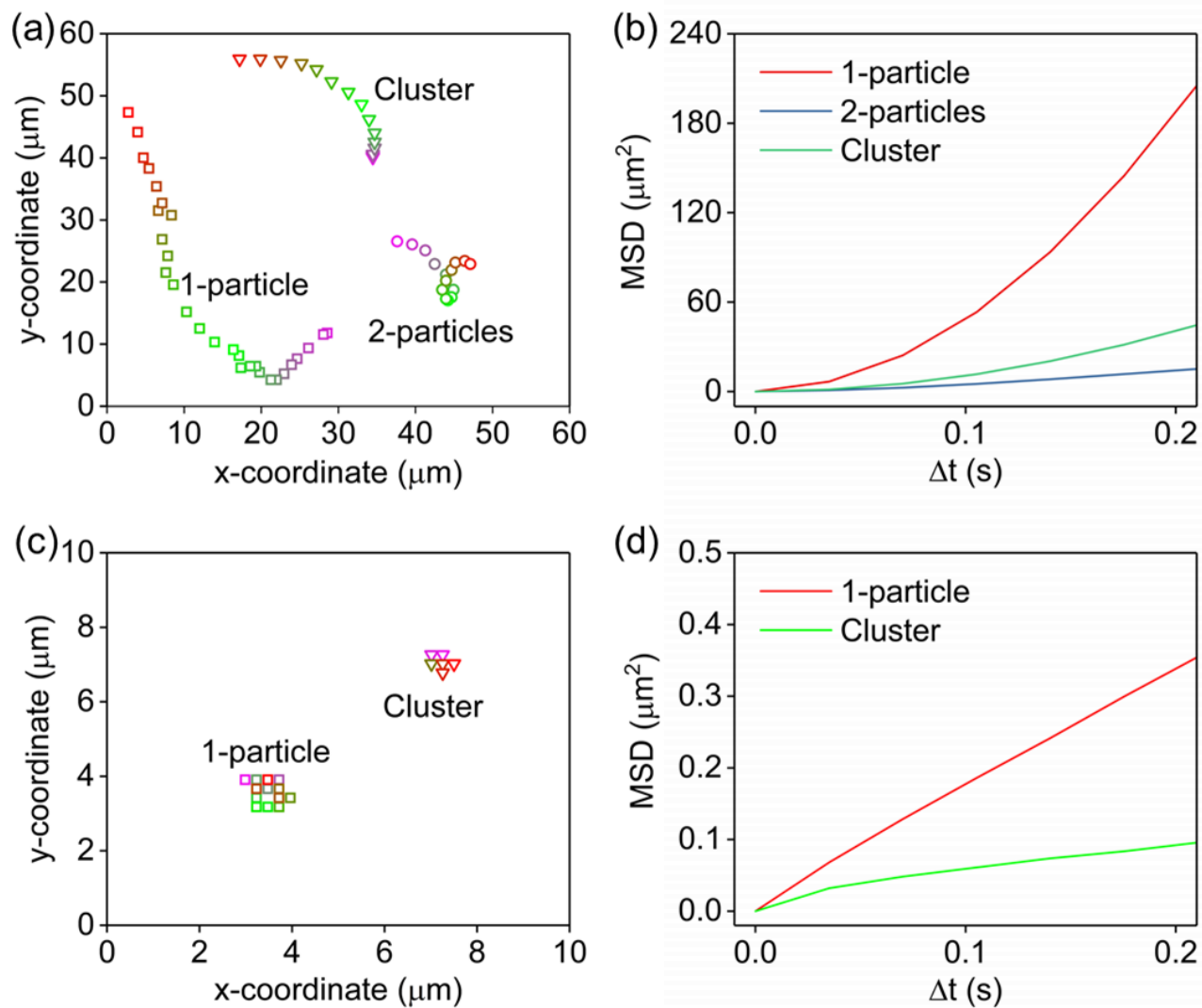


Figure S2. Trajectories (taken for 1 s) and the corresponding experimental MSD curves of different Janus particle assemblies in (a, b) 1000 \times and (c, d) 10 \times diluted human saliva solution under blue light illumination [$(106 \pm 1) \mu\text{W}/\text{mm}^2$] (video S5).

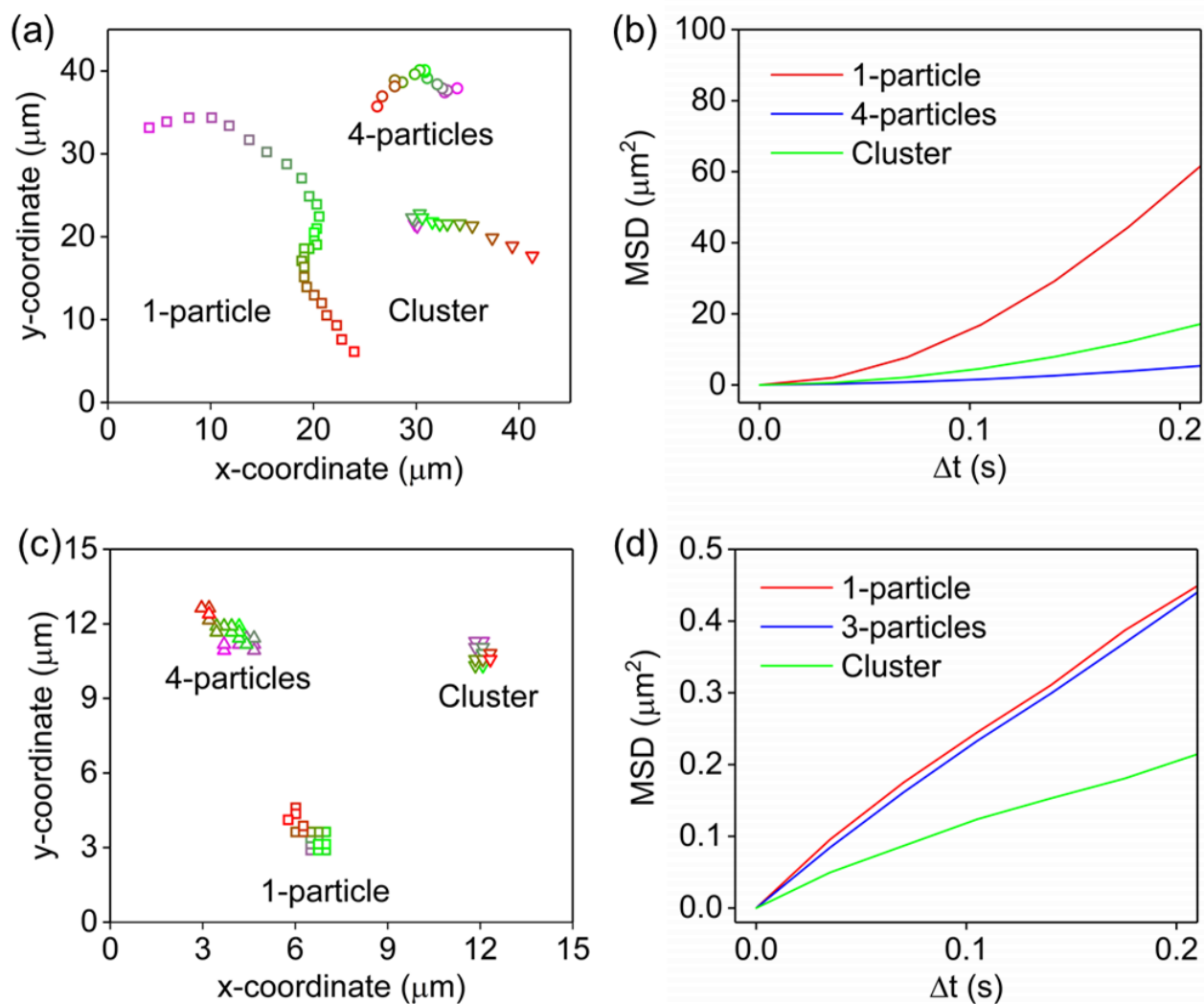


Figure S3. Trajectories (taken for 1 s) and the corresponding experimental MSD curves of different Janus particle assemblies in a PBS buffer solution with the concentration of (a, b) 0.001 mM and (c, d) 0.1 mM (video S6).

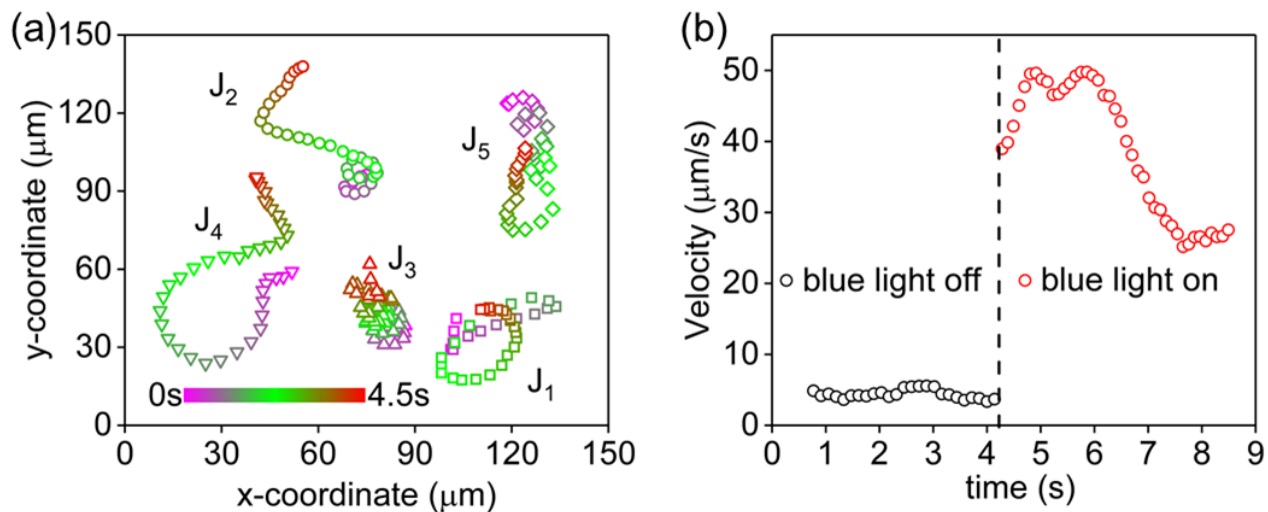


Figure S4. (a) Trajectories of fresh-prepared single Janus PS/Ag/AgCl micromotors (J₁-J₅) under blue light illumination. (b) The corresponding velocity of fresh-prepared single Janus PS/Ag/AgCl micromotors before and after turning on the blue light lamp [$(106 \pm 1) \mu\text{W}/\text{mm}^2$] (video S8).

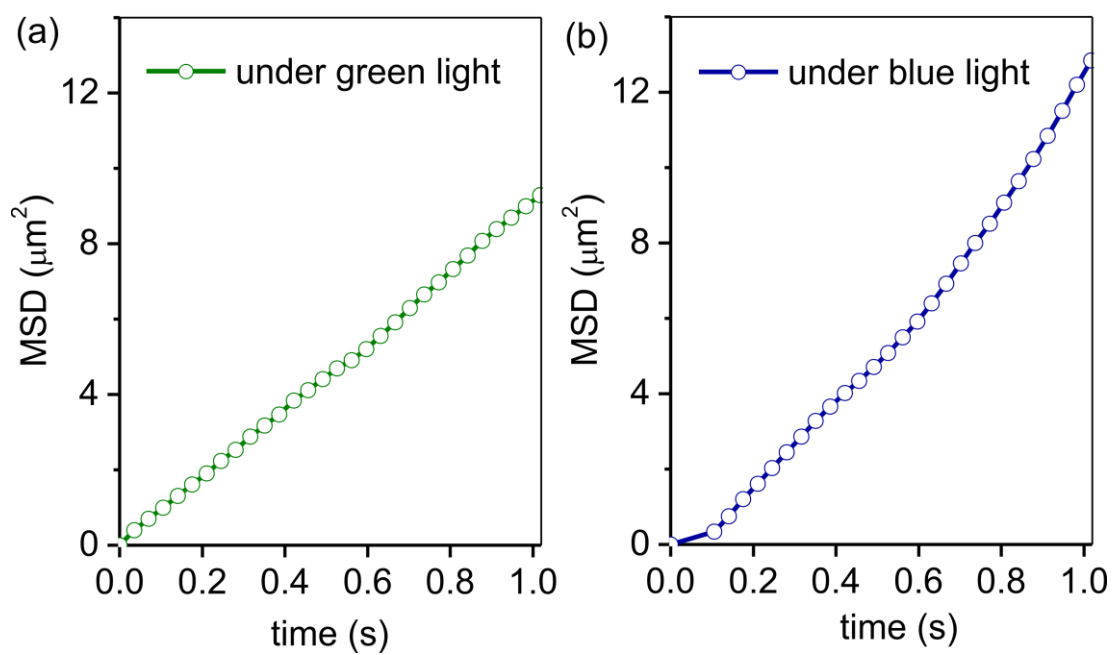


Figure S5. MSD curves of a reference Janus PS/Ag particle under (a) green and (b) blue light illumination (video S4).

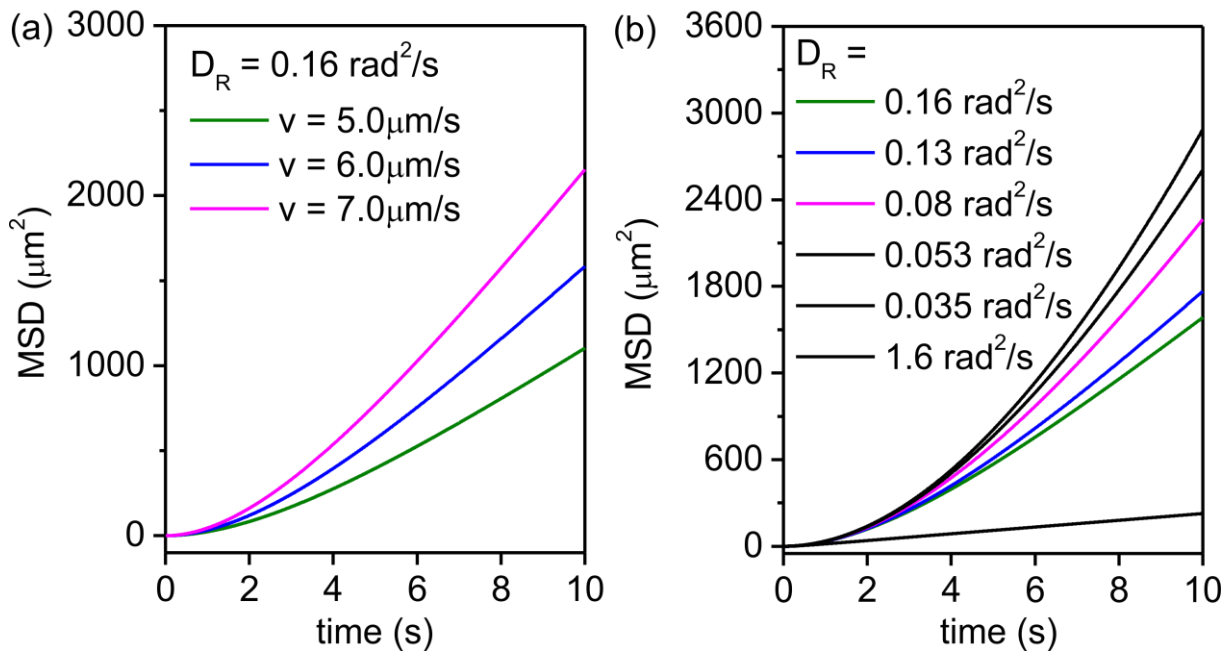


Figure S6. (a) Theoretical MSD curves for a Janus particle with radius $R_p = 1 \mu\text{m}$, translational and rotational diffusion coefficients $D_T = 0.22 \mu\text{m}^2/\text{s}$ and $D_R = 0.16 \text{ rad}^2/\text{s}$, correspondingly, and for varying self-propelled velocity $v = 5, 6,$ and $7 \mu\text{m}/\text{s}$. (b) Theoretical MSD curves for a Janus particle with radius $R_p = 1 \mu\text{m}$, self-propelled velocity $v = 6 \mu\text{m}/\text{s}$, translational diffusion coefficient $D_T = 0.22 \mu\text{m}^2/\text{s}$, and varying rotational diffusion coefficient $D_R = 0.16$ to $1.6 \text{ rad}^2/\text{s}$.

Table S1. Measured pH values and the corresponding calculated current equivalents (mV) of PBS and RhB solutions of different concentration.

Solution	pH (mV)
0.001 mM PBS	8.4 ± 0.2 (-80 ± 11.5)
0.01 mM PBS	7.5 ± 0.2 (-28.6 ± 11.5)
0.1 mM PBS	6.6 ± 0.2 (22.8 ± 11.5)
100 mM RhB	6 ± 0.2 (57.1 ± 11.5)

Supporting Video

Video S1: Trajectory recordings of a single Janus PS/Ag/AgCl particle (reference) under green light illumination and four single Janus PS/Ag/AgCl particles (J₁-J₄) under blue light illumination. (for Figure 3)

Video S2: Trajectory recordings of single Janus PS/Ag/AgCl particles under blue light illumination with different intensities. (for Figure 4)

Video S3: Trajectory recordings of micromotor assemblies (two, three, and cluster) under blue light illumination. (for Figure 5a, 5b)

Video S4: Trajectory recordings of a Janus PS/Ag particle under green and blue light illumination. (for Figure S5)

Video S5 (4x slower than the original speed): Trajectory recordings of Janus micromotors in a human saliva solution (1000/100/10 times diluted) under blue light illumination. (for Figure 6a and S2)

Video S6 (4x slower than the original speed): Trajectory recordings of Janus micromotors in 0.1/0.01/0.001 mM PBS solution under blue light illumination. (for Figure 6b and S3)

Video S7 (4x slower than the original speed): Trajectory recordings of Janus micromotors (J_1 - J_3) in 100 mM RhB solution under blue light illumination. (for Figure 6c)

Video S8: Trajectory recordings of fresh-prepared single Janus micromotors (J_1 - J_5) swimming in water under blue light illumination [$(106 \pm 1) \mu\text{W}/\text{mm}^2$]. (for Figure S4)