Electronic Supplementary Material (ESI) for Lab on a Chip

3D Microfluidic Chips with Integrated Functional Microelements Fabricated by Femtosecond Laser for Studying the Gliding Mechanism of Cyanobacteria

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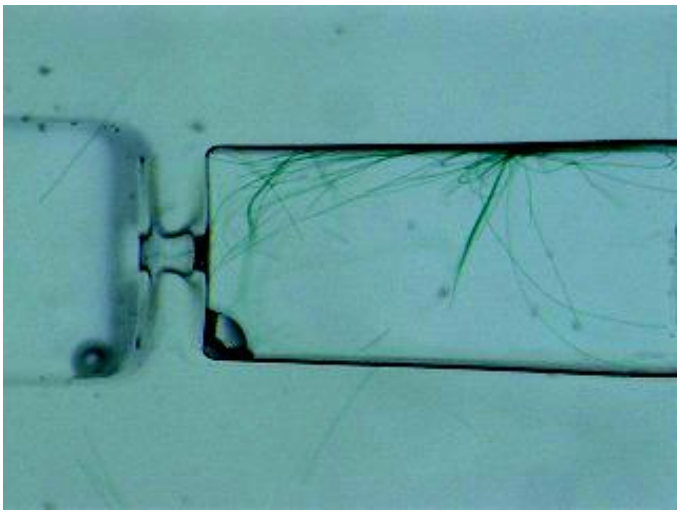

Figure S1: Enlarged image of *Phormidium* gliding to the high-CO_2 concentration region. Within 50 min, part of the *Phormidium* glided and attached to the exit of narrow microfluidic channel connecting to the left reservoir, which was filled with carbonic water having a high CO_2 concentration (50 ml CO_2 : 50 ml H_2O).

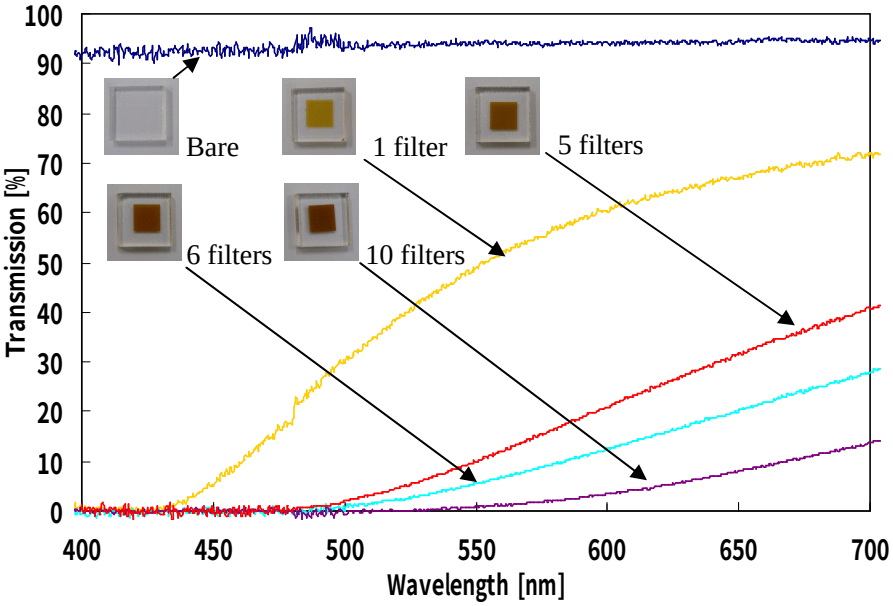

Figure S2: Transmission spectra of untreated Foturan glass and Foturan glasses integrated with optical filters of one, five, six and ten layers. The filter dimensions are 5 mm × 5 mm. The average transmittance in the wavelength range from 400 to 700 nm is evaluated to be 41 % for one layer, 14 % for five layers, 9 % for six layers and 3 % for ten layers.

Movie S1: *Phormidium* gliding in a T-shaped microfluidic channel. Images were taken every 3 min, and the video plays at 3 frames/s.

Movie S2: *Phormidium* gliding to the seedling root in a microfluidic channel covered with five layers of optical filters. *Phormidium* is gliding in the microfluidic channel toward the seedling root. Images were taken every 7 min, and the movie plays at 3 frames/s.

Movie S3: *Phormidium* gliding to the seedling root in a microfluidic channel covered with six layers of optical filters. *Phormidium* is hesitating at the entrance of the microfluidic channel. Images were taken every 7 min, and the movie plays at 3 frames/s.