

Supporting information for

Vapour-Driven Marangoni Propulsion: Continuous, Prolonged and Tunable Motion

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Video S1. Locomotion of an ethanol-driven aerogel membrane on water during an experiment of 54 minutes. The video is accelerated 20 times.

Video S2. Locomotion of a pentane-driven aerogel membrane on paraffin oil. The video is accelerated 20 times.

Experimental

The fluorinated nanocellulose aerogel was prepared as described by Jin *et al.* [H. Jin, M. Kettunen, A. Laiho, H. Pynnönen, J. Paltakari, A. Marmur, O. Ikkala, R. H. A. Ras, *Langmuir* 2011, 27, 1930-1934.] A piece of fluorinated aerogel membrane (called here vessel) with a fuel reservoir was placed on the surface of water (similarly on oil). The fuel reservoir was cut from a disposable cuvette wherein a piece of paper tissue was inserted to which a few drops of volatile liquid fuel were added, such as ethanol. The fuel reservoir with weight of 620 mg was placed on the rear of the vessel to let the ethanol evaporate through the aerogel and modify the water surface underneath the vessel non-uniformly. The position of the cup plays a role to control the direction of locomotion of the vessel. In order to analyze the steady locomotion, the vessel was designed to go a circular trajectory. In this way, it allowed to monitor the time of each periodic loop. A digital video camera was used to record the continuous locomotion. On paraffin oil a similar aerogel vessel setup was used with pentane as fuel. The fuel reservoir was 730 mg and the pentane consumption for the duration of the video was 71 mg.