

Supporting Information for “*Wireless Electrohydrodynamic Actuators for Propulsion and Positioning of Miniaturized Floating Robots*”

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Abstract

This Supporting Information includes:

Figure S1, S2, S3

Supplementary Video

- Supplementary Video S1: Locomotion of the mobile robot.
- Supplementary Video S2: Vortex deforming the liquid-liquid interface.
- Supplementary Video S3: Locomotion of the mobile robot without electrode attached.
- Supplementary Video S4: Locomotion of the mobile robot with reversed polarity.
- Supplementary Video S5: Drawing “SIT” by controlling a floating robot with multiple electrodes.

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Figure S1

Physical properties of the conductive and dielectric liquids employed in this work.

Physical property	Conductive liquid	Dielectric liquid		Mobile body
	NaCl solution 1.7 M	Novec 7100	Novec 7300	Acrylic plate
Density (kg/m ³)	1069	1510	1660	1190
Kinematic viscosity (cSt)	0.98	0.38	0.71	-
Dynamic viscosity (cSt)	1.04	0.58	1.18	-
Permittivity	-	7.52	6.14	4.5

Figure S2

Deformation of the liquid-liquid interface when a voltage of 1.6 kV is applied, without the presence of the mobile robot. The bending of the interface resembles the initial stages of Taylor cone formation (Supplementary Video S2).

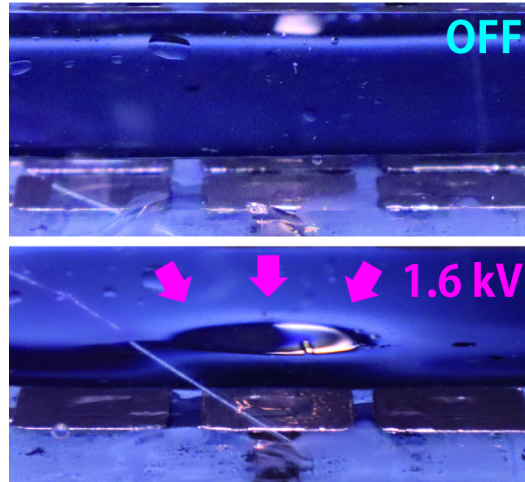
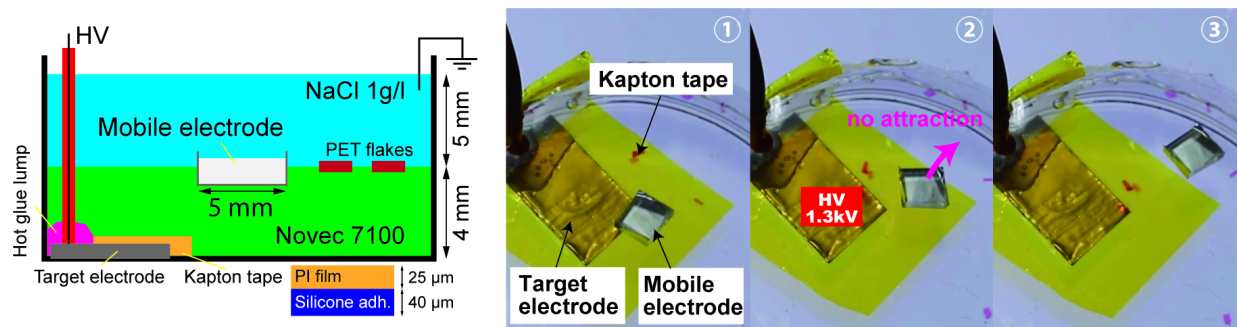


Figure S3

A simplified set-up to test the relative importance of capacitive and resistive driving force in the propulsion and stabilization of the robot. The bottom electrode is covered with an insulating film (65 μm Kapton tape) and the motion of the robot is observed from different starting positions. With the electrodes insulated and voltage in the range 1.3 kV – 3.5 kV, we did not observe any significant propulsion nor attraction. The robot slowly floated in the container driven by thermal fluctuations.



Supplementary Video S1

Rich media available at <https://youtu.be/j20jpysL00Q>

Supplementary Video S2

Rich media available at <https://www.youtube.com/watch?v=I-Ap1X4GIAY>

Supplementary Video S3

Rich media available at <https://www.youtube.com/watch?v=paEsyT7ofcI>

Supplementary Video S4

Rich media available at <https://www.youtube.com/watch?v=sPGVS5ZHds8>

Supplementary Video S5

Rich media available at <https://www.youtube.com/watch?v=2n0r-Agjm9E>