

## Method of Fluid Manipulation By Electrode wetting

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### SUMMARY

UCLA researchers in the Department of Mechanical and Aerospace Engineering have developed a novel method that allows the manipulation of liquid droplets on a surface.

### BACKGROUND

Electrode wetting on dielectric (EWOD) is a well-known effect that involves application of electric field to move or modify a fluid droplet. It is most commonly utilized in biomedical devices that require manipulation of small liquid volumes (on the order of 400nL). However, its main limitation is that it requires a hydrophobic surface. Since most synthesized or natural surfaces are hydrophilic, the dielectrics are coated with a hydrophobic material that often reduces the shelf life of the dielectric, is prone to failure and is costly.

### INNOVATION

UCLA researchers have developed a novel method termed electrode dewetting on dielectric (EDOD) that has the opposite effect of EWOD. It can be used to move or modify a fluid droplet much like EWOD but does not require a hydrophobic surface as EWOD does. The result is also opposite as it reduces the contact area (dewetting) between a liquid droplet and surface while EWOD increases the contact area (wetting) between liquid droplet and surface.

### APPLICATIONS

- ▶ Biomedical devices such as on-chip synthesis, in vitro fertilization culturing, high-throughput PCR
- ▶ Optical devices such as variable lens, electronic paper, video displays
- ▶ Electronic devices such as variable capacitor, electronic switch
- ▶ Mechanical instruments such as rheometer

### ADVANTAGES

- ▶ Simple set up
- ▶ Does not require permanent manipulation of the surface
- ▶ Compatible with hydrophilic materials such as glass
- ▶ Temporary changes that can be easily modified according to the requirements

### PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,325,127	05/10/2022	2016-409
France	Issued Patent	3405428	05/19/2021	2016-409
United Kingdom	Issued Patent	3405428	05/19/2021	2016-409

### ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Membraneless Fuel Cell with Self-Pumped Fuel and Oxidant](#)
- ▶ [Methods of Restoring and Maintaining Gas Film on Superhydrophobic Surfaces while Underwater](#)
- ▶ [A Low-Profile Flow Shear Sensing Unit](#)
- ▶ [Complete Transfer of Liquid Drops by Modification of Nozzle Design](#)

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### INVENTORS

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### OTHER INFORMATION

#### KEYWORDS

EWOD, dewetting, fluid manipulation

#### CATEGORIZED AS

- ▶ [Materials & Chemicals](#)
- ▶ [Other](#)
- ▶ [Engineering](#)
- ▶ [Other](#)

#### RELATED CASES

2016-409-0

- ▶ Stereo Image Acquisition By Lens Translation
- ▶ Method for Commercial Production of Super-Hydrophobic Materials
- ▶ A Built-In Mechanism Of Gas Maintenance In Microfeatures On A Submerged Surface
- ▶ No-Assembly Devices for Microfluidics Inside a Cavity
- ▶ Liquid-Repellent Surfaces Made of Any Materials
- ▶ On-chip, Real-time Feedback Control for Electrical Manipulation of Droplets
- ▶ Micropumping of Liquids by Directional Growth and Selective Venting of Bubbles
- ▶ Microstructured Cathode for Self-Regulated Oxygen Generation and Consumption

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