

Method of Fluid Manipulation By Electrodewetting

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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

- ▶ [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](#)
- ▶ [Stereo Image Acquisition By Lens Translation](#)

CONTACT

UCLA Technology Development Group
 ncd@tdg.ucla.edu
 tel: 310.794.0558.



INVENTORS

- ▶ Kim, Chang-Jin

OTHER INFORMATION

KEYWORDS

EWOD, dewetting, fluid manipulation

CATEGORIZED AS

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

RELATED CASES

2016-409-0

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UCLA Technology Development Group

10889 Wilshire Blvd., Suite 920, Los Angeles, CA 90095

tdg.ucla.edu

Tel: 310.794.0558 | Fax: 310.794.0638 | ncd@tdg.ucla.edu

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