Analytical Instrumentation, Methods & Materials

More Flexible Microlens Assembly

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WARF: P120362US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing variable-focus liquid lenses that can be mounted on a curved surface.

Overview

'Variable-focus' lenses are lenses that have adjustable focal lengths. Liquid-based, miniaturized lenses of this type are useful in photonics, display systems and biomedical tools. However, they are limited to flat surfaces.

For example, electrowetting microlenses typically are fabricated on glass, silicon or other flat rigid substrates. These lenses are extremely promising because they are filled with fluid and can be tuned via an electric field that alters surface tension. Making them more flexible could transform optical technologies from cell phone cameras to medical probes.

The Invention

UW–Madison researchers have developed an electrowetting liquid lens assembly that can be wrapped onto a curved surface.

The lens is made of two immiscible fluids, such as water and silicone oil, and is contained within a chamber. This chamber sits on a flexible polymer base that takes stress off the lens and allows it to be mounted onto a non-flat surface.

Voltage can be applied to electrodes set within the chamber. This causes the curvature of the water-oil interface to change, thereby adjusting focal length.

Applications

- Small lenses and microlenses for optical analysis
- Cell phone cameras

Key Benefits

- Allows flat components to be wrapped and curved
- Enables greater field-of-view
- Focal adjustment is fast and takes very little space
- Compact and easily fabricated

Additional Information

For More Information About the Inventors

- Hongrui Jiang

Related Technologies

- For more information about microlenses that use hydrogels to adjust focal length, see WARF reference number P05131US.

Publications

- Li C. and Jiang H. 2012. Electrowetting-Driven Variable-Focus Microlens on Flexible Surfaces. Applied Physics Letters. 100, 231105.

Tech Fields

- Analytical Instrumentation, Methods & Materials : Optics

For current licensing status, please contact Michael Carey at mcarey@warf.org or 608-960-9867