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Microfluidic Platforms for Optical Biosensing

Researchers at the University of South Florida have developed a novel microfluidics platform that enables reversible trapping of microspheres suitably for optical sensing.

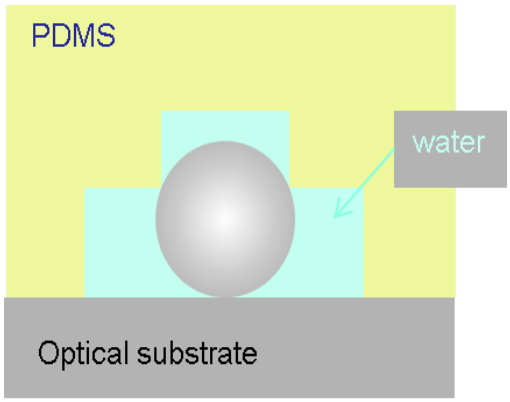
Optical resonators such as microspheres are attractive as sensors in high precision applications. Typically, for sensing applications, handling and positioning of the sphere for optical alignment is often problematic. Currently demonstrated solutions in fluidic environment include having the microsphere on a stem and handling with micro positioners, or permanently bonding the sphere to the optical substrate or fiber, which are irreversible and cumbersome.

Our researchers have invented a new technique wherein they propose a microfluidics platform which enables a microsphere to be easily and reversibly positioned for optical sensing, without the need for a stem. Hence the microfluidic platform can be reused for measuring multiple microsphere resonators or the same microsphere coated with targeted bio-species. The invention consists in a microfluidics device with a novel channel designed to flow a microsphere-containing fluid and immobilize a microsphere at a chosen location. This is particularly attractive to optical sensing as the location can be prealigned with optical elements in the testing set up or with an integrated optical waveguide. The microspheres in solution can be made target specific and be used as disposable probes for bio sensing applications. This technology has a wide range of applications in sensing and bio-sensors.

ADVANTAGES:

- **Reduces need for permanent attachment in the microsphere**
- **Can be reused for measuring multiple microsphere resonators**
- **Lessens the bulkiness of the device**
- **Significantly reduces calibration time**

Future of Optical Biosensing Apparatus (Instruments)



Cross-Sectional View Schematic Showing Trapped Microsphere at a Target Position

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