

Spectral Tuning Of Liquid Microdroplets A Thesis Submitted To The Graduate School Of Engineering For For The Degree Of Master Of Science In Physics

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Spectral Tuning Of Liquid Microdroplets

The liquid nature of the microdroplets provides large spectral tuning which can not be obtained by using solid microcavities. The large spectral tuning of WGMs of liquid microdroplets can be obtained by the size change by using evaporation/condensation kinetics or the shape deformation by using electrowetting.

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Using electrowetting, we demonstrate reversible spectral tuning of the whispering gallery modes of glycerol/water microdroplets standing on a superhydrophobic surface by up to 4.7 nm at 400 V. Our results can inspire electrically tunable optical switches and filters based on microdroplets on a superhydrophobic surface.

Spectral tuning of liquid microdroplets standing on a ...

(PDF) Spectral tuning of liquid microdroplets standing on a superhydrophobic surface using electrowetting | Ahmet F. Coskun - Academia.edu Using electrowetting, we demonstrate reversible spectral tuning of the whispering gallery modes of glycerol/water microdroplets standing on a superhydrophobic surface by up to 4.7 nm at 400 V.

(PDF) Spectral tuning of liquid microdroplets standing on ...

The decrease in the contact angle leads to an increase in the equatorial radius of the microdroplets result- ing in the redshift of the WGMs which circulate in the equa- torial plane parallel to the surface. We demonstrate spectral tuning by up to 4.7 nm as a result of a maximum applied voltage of 400 V.

Spectral tuning of liquid microdroplets standing on a ...

The whispering gallery modes (WGMs) of liquid microdroplets can have high quality factors due to the large contact angle. The liquid nature of the microdroplets provides large spectral tuning which can not be obtained by using solid microcavities. The large spectral tuning of WGMs of liquid microdroplets can be obtained by the size change by

SPECTRAL TUNING OF LIQUID MICRODROPLETS STANDING ON A ...

These findings indicate laser induced evaporation of the microdroplet as the source of the spectral tuning mechanism. Constant infrared laser illumination leads to the evaporation of the water content of individual microdroplets until a new equilibrium is established with the sealed chamber.

Erratum: "Large spectral tuning of liquid microdroplets by ...

For salty water microdroplets the reported spectral tuning mechanism is almost fully reversible, while for the case of glycerol/water microdroplets the spectral tuning mechanism can be made highly reversible when the chamber is saturated with glycerol vapor and the relative water humidity approaches unity.

Large spectral tuning of liquid microdroplets by local ...

Spectral tuning up to 30nm is presented in the whispering gallery modes as a result of the deformation of the microdroplets toward a truncated prolate spheroid geometry. Observed large spectral tuning is also reported to be highly reversible.

Large spectral tuning of liquid microdroplets standing on ...

Abstract We demonstrate large spectral tuning of glycerol/water microdroplets standing on a superhydrophobic surface using the optical scattering force exerted by a 1064 nm Nd 3+: YVO 4 solid-state laser. Spectral tuning up to 30 nm is presented in

(PDF) Large spectral tuning of liquid microdroplets ...

At the new equilibrium state, the non-volatile component, (i.e. glycerol or salt) attains a higher concentration in the liquid microdroplet. We report tunability over large spectral ranges up to 30 run at around 590 nm.

Large spectral tuning of liquid microdroplets by local ...

Spectral tuning up to 30 nm is presented in the whispering gallery modes as a result of the deformation of the microdroplets toward a truncated prolate spheroid geometry. Observed large spectral...

(PDF) Large spectral tuning of liquid microdroplets ...

Using electrowetting, we demonstrate reversible spectral tuning of the whispering gallery modes of glycerol/water microdroplets standing on a superhydrophobic surface by up to 4.7 nm at 400 V. Our...

Spectral tuning of liquid microdroplets standing on a ...

A. Kiraz, Y. Karadağ, and A. F. Coskun, "Spectral tuning of liquid microdroplets standing on a superhydrophobic surface using electrowetting," Appl. Phys. Lett. 92, 191104 (2008).

OSA | Spectral tuning of lasing emission from optofluidic ...

microdroplet radius of 4 mm, the spectral shift is predicted to be $\Delta\lambda = 0.0004 - 0.0008$ nm using the asymptotically linear relationship between the spectral position of the whispering-gallery modes (WGMs) and the normalized equatorial radius ($\Delta\lambda = r/h$). 17,18 This spectral shift is much smaller than

Large spectral tuning of a water-glycerol microdroplet by ...

Electrical and thermal tuning of quality factor and free spectral range of optical resonance of nematic liquid crystal microdroplets Junaid Ahmad Sofi, M. A. Mohiddon, N. Dutta, and Surajit Dhara* School of Physics, University of Hyderabad, Hyderabad 500046, India

Electrical and thermal tuning of quality factor and free ...

As such, remarkable sensing of water-soluble organic compounds with a sensitivity of free spectral range as high as 19.85 THz / (mol · mL⁻¹) and the detectivity limit around 5.56 × 10⁻³ mol · mL⁻¹ is achieved.

Reconfigurable Liquid Whispering Gallery Mode Microlasers

We demonstrate a detection method for heavy metal (HM) ions based on whispering gallery mode (WGM) lasing in a liquid crystal (LC) microdroplet biosensor. By doping with stearic acid, nematic LC 4-cyano-4'-pentylbiphenyl (5CB) microdroplets are biochemically functionalized and used as both optical microresonators and sensing elements. Typical WGM lasing emission is observed in stearic ...

OSA | Detection of heavy metal ions using whispering ...

LC microdroplets have nearly perfect spherical structures and smooth surfaces, so they can be used as good WGM resonators [38,39,41,42]. The difference in refractive indexes between LC microdroplets and the immersion liquid prompts the fluorescence emitted by the dye to be trapped in microdroplets in the form of WGMs.

Detection of heavy metal ions using whispering gallery ...

Microspheres with a smooth surface are readily attainable with droplets that are created in a self-formation manner by either emitting aerosol or mixing hydrophilic and hydrophobic liquids [9, 12–16, 18, 20–26]. An advantage of droplets is deformability that allows resonance wavelength tuning [12, 18, 21, 23, 24, 26].