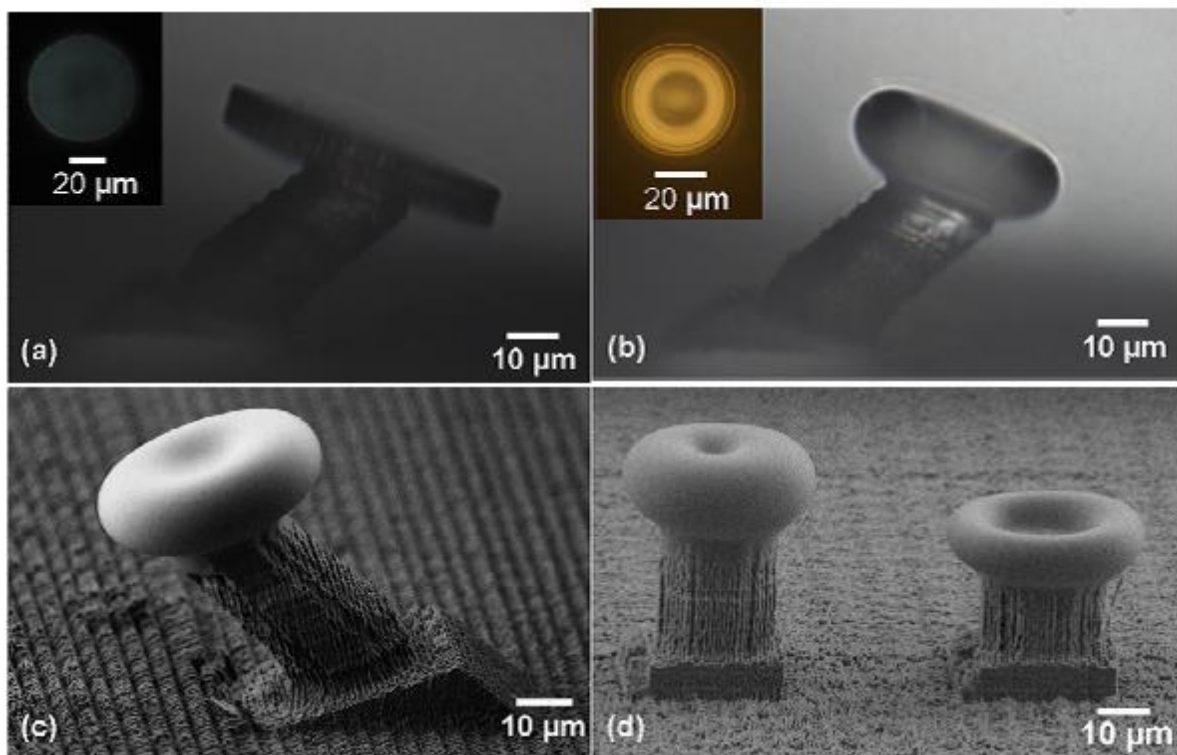


3-D laser printing of whispering-gallery-mode microcavities

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Microscope images of WGM microcavities fabricated by femtosecond laser 3-D processing. Credit: ©Science China Press

Whispering-Gallery-Mode (WGM) microcavities that confine light in a small volume with high quality (Q) factors and enhance interaction of light with matters inside the cavity have shown promising applications as

an element for a variety of devices such as micro-lasers, micro-sensors, micro-filters, and thus are becoming the basic building blocks of integrated photonic systems. This leads to tremendous progress in the development of micro-scale high-Q microcavity processing technologies.

In a review entitled "Femtosecond laser 3D fabrication of whispering-gallery-mode microcavities" by Huailiang Xu and Hongbo Sun at the State Key Laboratory on Integrated Optoelectronics, Jilin University, recent progress in femtosecond laser three-dimensional fabrications of optical WGM microcavities was overviewed. This review was published in *Science China Physics, Mechanics & Astronomy* (volume 58, Issue 11).

Femtosecond laser direct writing has attracted a lot of attention in recent years, and demonstrated the versatility in fabrication of a variety of devices from micro-fluidics, optoelectronics, micro-electronics, micro-machines, micro-sensing, to micro-biomimetics and micro-optics, etc. However, the reports on the fabrication of high-Q WGM microcavities appeared only recently.

This review article began with a brief introduction of the basic principle of femtosecond laser processing, in which the 3D capability of high-quality micro-fabrication of femtosecond laser processing technique is discussed.

Subsequently, the fabrications of 3D passive and active WGMs microcavities in a variety of materials including polymer, glass and crystals were demonstrated. The fabrication of the integrated device of a micro-sensor incorporated with WGM microcavity was also introduced.

They pointed out that fabricating microcavities with extremely high Q factors in the range of 10^8 - 10^{10} by using femtosecond [laser](#) direct writing is still challenging. However, "it is believed," the two researchers said, "the further effort on the investigation of [femtosecond laser](#) 3D

fabrication of high-Q factor microcavities will undoubtedly benefit the applications of microcavities in a broad spectrum from bio-sensing and optoelectronics to quantum information.."

More information: HuaiLiang Xu et al. Femtosecond laser 3D fabrication of whispering-gallery-mode microcavities, *Science China Physics, Mechanics & Astronomy* (2015). [DOI: 10.1007/s11433-015-5720-5](https://doi.org/10.1007/s11433-015-5720-5)

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