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Nano- and micro-structures fabricated with femtosecond lasers

Femtosecond-laser inscription/machining technology emerged in recent years as very powerful tool to fabricate microscale/nanoscale structures in transparent and nontransparent materials. Compared with conventional UV-laser inscription technology, fs-lasers can offer some unique advantages. First, the nonlinear nature of the absorption confines any induced changes to the focal volume. The spatial confinement, combined with laser-beam scanning or sample translation, make it possible to micromachine geometrically complex structures in three dimensions. Second, the absorption process is independent of the material, enabling optical devices to be fabricated in compound substrates of different materials. Third, the regions treated by fs-laser have a remarkably high etching rate compared with pristine material, which enable the flexible fabrication of holey structures such as microchannels. Since intense femtosecond laser pulses enable highly localized material modification virtually in any material, it can thus be an excellent tool for the micro- and nano- fabrication of microstructures in a variety waveguides. In this paper, we will discuss some nano- and micro-structure made in different waveguides and material using femtosecond laser. We will also discuss their functionality and potential applications.

Biography

Xuewen Shu has completed his PhD from Huazhong University of Science and Technology (HUST), China. He worked as a Senior Scientist at Aston University & Indigo Photonics Ltd., UK during 2001-2013. He is currently a full Professor at HUST. He has published more than 150 papers in reputed journals and conferences and has been serving as an Editorial Board Member for two international journals.

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