

Manufacturing of femtosecond laser induced self-assembled nanostructure arrays

Cong Wang, Mengyan Shen*, Haibin Huo, Haizhou Ren, Fadong Yan and Michael Johnson
Department of Physics and Applied Physics, and Nanomanufacturing Center, University of Massachusetts at Lowell

*contact author: mengyan_shen@uml.com

Poster

Short Description: Pulsed laser-assisted etching is a simple but effective method for fabricating small regular structures directly on a solid surface. Furthermore, the femtosecond laser irradiation can produce 10^{10} w peak power in 10^{-15} second, and in such extremely conditions, a group of special nanostructures arrays can be auto-assembly formed on semiconductor or metal surface, which possess various favorable properties and can be used as photosynthesis catalyst, gas sensor, supercapacitor, and etc.

Keywords: Femtosecond laser, nanostructures arrays, auto-assembly, semiconductor, metal, photosynthesis, sensor, supercapacitor

Abstract:

In nano-scale, due to the size of nanoparticles or nanostructures, the surfaces are dramatically increased, which then could greatly improve the properties of the materials in various application areas.

By using a Ti:sapphire femtosecond laser to irradiate cobalt microparticle powder dispersed in water[2], the surfaces of the cobalt microparticles are transformed into nanometer-scale flakes or grass-like structures (SEM images in Fig. 1a b). In similar way, nanoscale structure arrays with similar size scale can be formed on Si, Fe, Stainless steel, and Pt materials (Fig. 1 c d e f).

A series of experiments are conducted and primarily analyzed, and the results show many positive progresses in applying this group of nanostructures as photosynthesis catalyst, gas sensor, supercapacitor, and Raman enhancement bases.

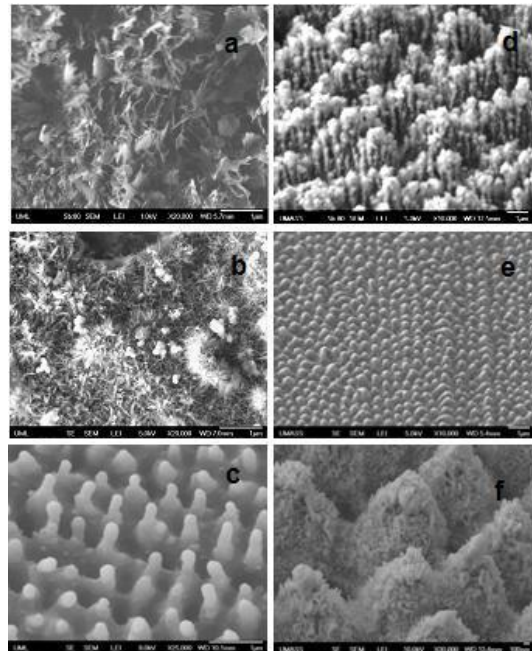


Figure 1

References

- [1] For further information about this project link to mengyan_shen@uml.com
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