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Nanoscale holographic aluminum oxide gratings based on two beams interference method by femtosecond laser pulse

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Holographic three dimensional (3D) lithography is a process to create a 3D structure on a sample substrate by the aid of hologram. The conventional fabrication process such as direct laser beam writing or gray-tone lithography can be used to create one of a kind hologram and multilevel or continuous-level computer generated holograms. Especially, it has been shown that optical gratings can be encoded on the sample surface by two beam interference of a single near infrared femtosecond laser pulse. In general, diffraction gratings were fabricated on optical materials such as silver-halide emulsion, photoresist, and photopolymer.

In this work, fabrication of nano-scale holographic gratings on Al_2O_3 surface using femtosecond laser pulse was demonstrated. Holographic gratings fabrication using two beams interference method on Al_2O3 which deposited using ALD device has never been reported. With holographic gratings method, either fabrication time or fabrication cost will be reduced. Moreover, this type of diffraction gratings can be applied for power magnification of the ultra-short laser system.

Biography

Sung-Jin Kim received the Ph.D. degree in the School of Electrical and Computer Engineering from Seoul National University, Seoul, Korea, in 2006. In, 2007, he was a Postdoctoral Research Scientist with the Department of Electrical Engineering, Columbia University, New York, NY, where he was initially engaged in research on the application of nano technology and new processing strategies for highly integrated systems. In 2008, he joined the School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, as a Postdoctoral Fellow working on solution-processable nano structured devices. His current research interests include the nanodevices, flexible nanoprinting electronics, and energy harvesting nano applications.

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Oral administration of C60 fullerene increases lifespan of male Wistar rats

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In recent years concerns have been raised about the possible toxicity in mammals of long-term exposure to nanomaterials. Moussa and colleagues recently published the results of a study in which they report that, far from exhibiting chronic toxicity, C60 fullerene supplementation in male Wistar rats produced one of the largest increases in lifespan ever recorded in mammals for any pharmacological or genetic intervention. Previously, the longest lifespan recorded for Wistar rats was 47 months in calorie-restricted transgenic rats with an antisense construct against growth hormone (GH). The mean lifespan of rats treated with C60 dissolved in olive oil was 42 months and the maximal lifespan was 54 months, as compared to 26 and 50 months, respectively, for rats treated with olive oil alone. C60 administration also protected against CCl4-induced oxidative stress as judged by microscopic analysis of tissue sections, alanine amino-transferase (ALT), catalase, superoxide dismutase (SOD) and GSSG/TGSH ratio measurement. These results indicate that controlled exposure to C60 fullerene may provide therapeutic potential against diseases of aging.

Biography

Sven Bulterijs is the Co-Founder, Co-President and Chief Science Officer of Heales. Heales is the largest non-profit organization in Continental Europe promoting and advocating scientific research into longevity and biogerontology. He has published several papers in peer-reviewed journals including an opinion piece about the future of longevity in the journal "*Pan-European Networks Science & Technology*". He served as a member in the organizational committee of two scientific conferences.

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