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Preparation of patterned biological film for nanolithography

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It is a great challenge to fabricate the biological films with patterned structures or ultra-thin thickness for nanolithography in the field of bioelectronics. Many techniques such as optical lithography, electron beam lithography, dip-pen and nanoimprint lithography have been developed and applied to prepare the bio-films. However, most organic molecules are so fragile that the fabrication process of their films requires physiologic and gentle conditions. Here, in our lab we introduce new bio-film possessing methods and the prepared films are of well-patterned structures with ultra-thin thickness. (I) Two-dimension (2D) Xanthan scaffold layers with nanofibril structures were build up through annealing the xanthan solution. In this experiment, temperature plays a critical role to affect the scaffold formation during the annealing process. (II) Porous stearic acid (SA) monolayer films were prepared by means of etching the SA Langmuir-Blodgett (LB) film in salt solution. The pores size and coverage area can be easily adjusted by controlling the salt concentration and immersion duration time. Moreover, the cationic valence in solution and the surface pressure of SA LB film will affect the etching result as well. (III) Uniform ultra-thin chitosan films were fabricated using mechanical manipulating by atomic force microscopy (AFM). The quality of the film is determined by the diameter of chitosan nanoparticles spin-coated on the substrate, the viscoelastic property of the chitosan particles, humidity and temperature of the surrounding enviroment. Adopting these three novel and simple methods to fabricate the bio-films will path a promising way to the nanolithography, biosensors, bioelectronics etc.

Biography

Bo Liu was born in Henan, China, in 1975. He received a B. S. degree in physics from Fudan University in 2001. He came to Denmark in 2001, received a Ph. D degree in physics from Aarhus University in 2004. He has worked as a postdoc in the department of chemistry at Oxford University in 2005. He is the director of photo-biophysics lab in Henan University since 2006. His research interests include self-assembly of biomaterial, AFM and STM characterization, theoretical calculation. He has published more than 40 papers in reputed journals.

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