Application of Functional Nano-Patterning to Polymer Medical Micro Implants

Improvement of cells adhesion to medical implants can be achieved through specific surface nano-patterns. The application of nano-patterns to planar surfaces can be obtained in a number of ways. However, the application of functional nano-patterns to complex 3D surfaces is a challenging task. In this paper the application of a nano-pattern deriving from aluminium anodizing to 3D micro mould inserts for replication of polymer medical micro implants is described. A process chain earlier developed at DTU was applied, where the main steps include the fabrication of an aluminium master, anodizing, etching of aluminium oxide, nickel and copper electroplating and selective etching of the aluminium master. The resulting nanostructure consists of tightly packed hemispherical features with average diameter of approximately 400 nm. Characterization of the obtained nanostructure on the micro mould inserts was carried out by means of atomic force microscopy and scanning electron microscopy. Results show that the specific nano-pattern was successfully generated on the 3D mould inserts exploiting the proposed process chain.

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