

SYNTHESIS OF BIOACTIVE TITANIANANOFIBROUS STRUCTURES VIA OXIDATION

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Abstract: Titania (TiO₂) nanofibers with controllable diameters have been successfully fabricated in situ on a Ti-6Al-4V substrate by a thermal oxidation process. Their morphology, elemental composition, crystal structure, surface roughness and surface wettability were characterized by field-emission scanning electron microscope (FESEM), energy-dispersive X-ray spectroscopy (EDX), X-ray diffractometer (XRD), atomic force microscope (AFM) and contact angle goniometer. The results showed that the diameter of the resulting TiO₂nanofibers can be controlled within the range of 45-65 nm by changing the flow rate of Argon gas.The results of material characterization studies revealed that TiO₂nanofibers with smaller diameter possessed greater surface roughness and hydrophilicity, as well as the degree of crystallinity. Therefore, we envisage that such surfaces can be ideally used as biomedical implants for size-dependent cellular response.