Preparation of Heparin-Eluting Stent with TiO_2 Coated by using PECVD

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Drug eluting stent was made of drug loading on polymer coated metal stent. But polymer coated stent has show some troubles when drugs were consumed.
In this work, TiO_2 thin film was coated onto metal stent surface instead of organic polymer because TiO_2 was known as biocompatable material.
TiO_2 thin film was deposited onto metal stent surface by PECVD process using TTIP (Titanium(IV) isopropoxide) as a precusor and oxygen gas as reactive gas at 400℃. Then deposited TiO_2 surface was modified by low temperature plasma process to enhance functional groups. for drug grafting. Optimal modification conditions were investigated by changing RF discharge power and treatment time. Then, carboxylic groups in heparin was grafted onto modified TiO_2 surface by esterification reaction at 60℃, 1hr in acidic condition. Surface morphology, chemical structure and atomic composition of TiO_2 deposited and heparin grafted surface were analyzed by FE-SEM, FT-IR/ATR, ESCA, respectively. Quantitative analysis of grafted heparin onto a stent was measured by UV-visable spectrometer at 631nm. In-vitro drug eluting test was performed in PBS buffer.