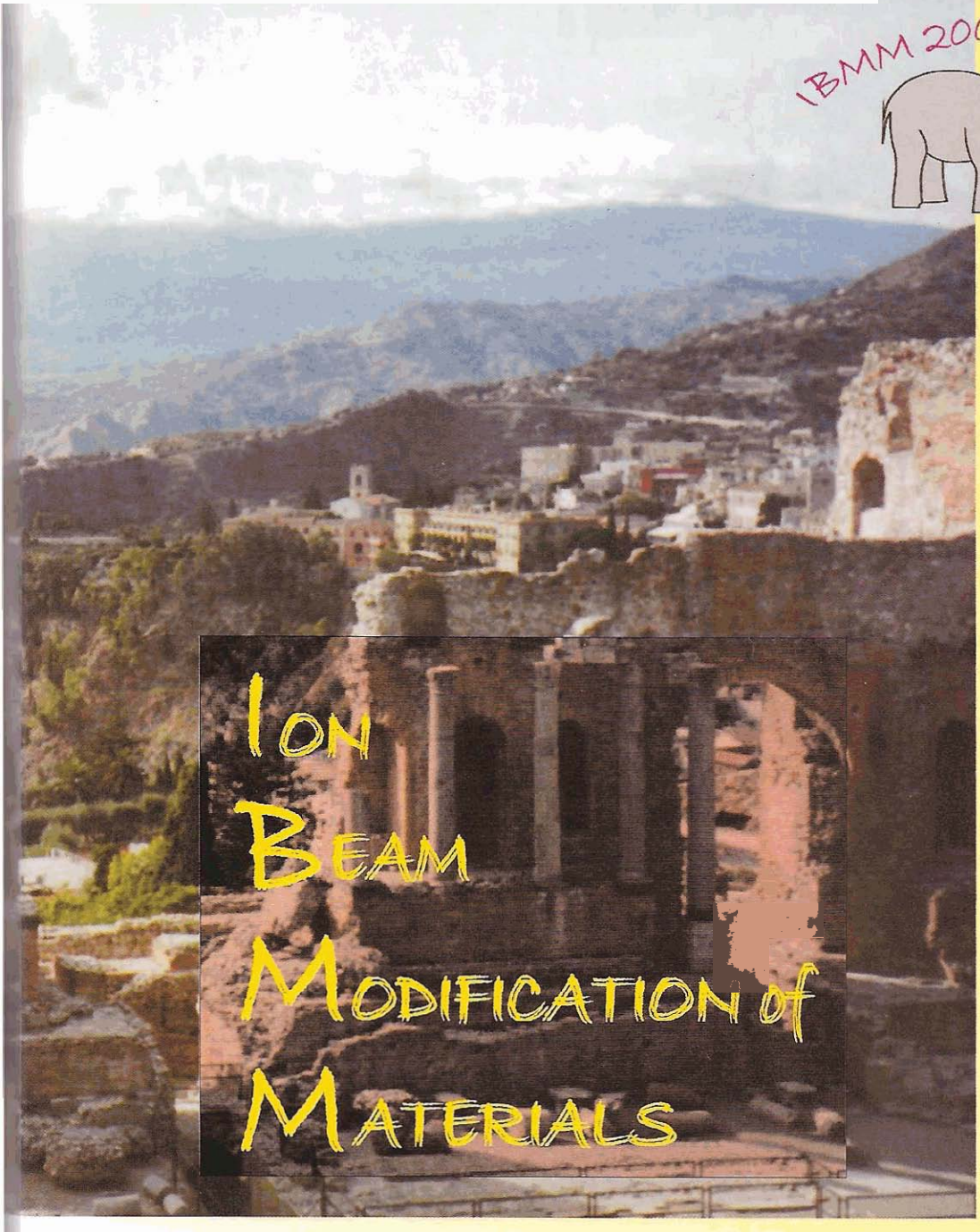

IBMM 2006

Ion Beam Modification of Materials

Program and Abstracts

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In vitro evaluation of diamond-like carbon coatings with a Si/SiC_x interlayer on surgical NiTi alloy

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Diamond-like carbon (DLC) coatings are produced with an intermediate layer of Si/SiC_x by a hybrid plasma implantation and deposition process to improve the adhesion of the carbon layer on surgical NiTi alloy substrate. The structures, mechanical properties, corrosion resistance and biocompatibility of the coatings were evaluated *in vitro* by means of Raman spectroscopy, pin-on-disk test, potentiodynamic polarization tests, and simulated fluid immersion tests. The results reveal that the DLC coatings with a Si/SiC_x interlayer has better adhesion, lower friction coefficient, and better corrosion resistance. The Si/SiC_x interlayer with a suitable thickness can increase the adhesion between the DLC film and NiTi alloy substrate. The DLC coated samples show low friction coefficients. In the simulated body fluid tests, the coatings offer effective corrosion protection for the NiTi alloy substrate, and moreover, the biocompatibility of the coating is reconfirmed by using PC12 cells culture. Our results indicate that the DLC films fabricated with a Si/SiC_x interlayer may be suitable as protective coatings for biomedical NiTi materials.