LASER OBTAINING OF NANOBIOMATERIALS

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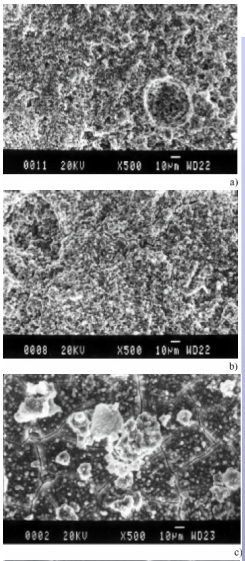


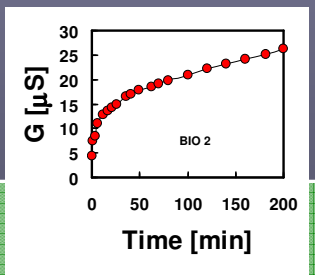
Scanning Electron Micrograph of the Bioglass specimens immersed in SBF for (a) 12 h, (b) 18 h, (c) 24h and (d) 48 hours.(x 500) [15]

Introduction

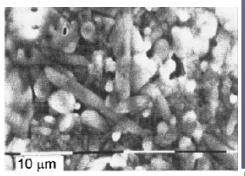
Nanomaterials were obtaind by using laser deposition for different applications. Biomaterials were prepared from glass and glass ceramic that contain CaO, SiO2, B2O3, Na2CO3 and P2O3 [1-14].

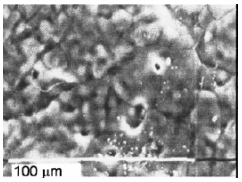
METHODS

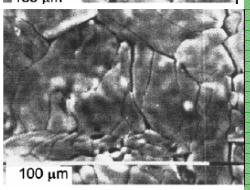
Nanobiomaterials were prepared by using the laser from powder mixture . A bioactive amorphous material was deposited on Ti substrates using a laser processing. A CW CO2 400 W laser was used, (laser power 30, 70, 100 W, irradiation time within 30 and 120 s). During the laser deposition process, the chemistry, structure and bio characteristics of bioactive materials can be controlled. The powder mixture composition was SiO2= 40-50% mol, P2O5= 3-7% mol, CaO=20-25Mol%, MgO=20-25 mol %. The obtained materials were characterized by hidrolitic stability (using the conductomeyric method), FTIR, EDAX and biocompatibility. In both cases homogenous amorphous materials were obtained with good biocompatibility tested by immersion in BSF, and Vero cells culture. The adhesion to metals of ceramic materials was good. The FTIR spectrum presentes the stretching vibration of P–O–P at 710 cm -1and Si-O-(Si) vibration.



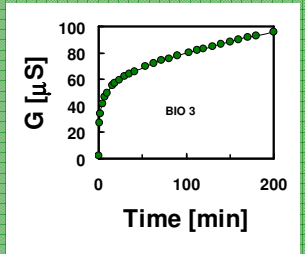
Hydrolytic stability of BIO 2 sample measured by conductometric method







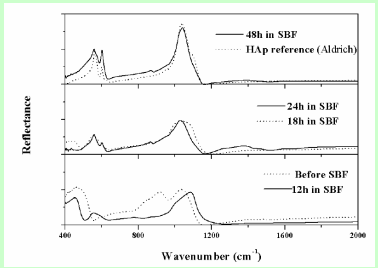
SEM micrographs of biomaterials after the in vitro experiments [16]



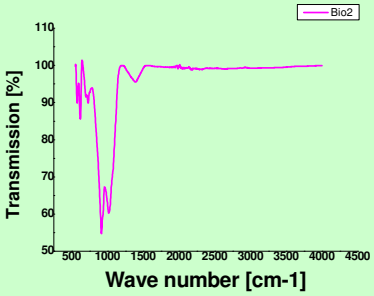
Hydrolytic stability of BIO 2 sample measured by conductometric method

RESULTS AND DISCUSSION

The hidrolitic stability was in the range of usual glasses.
The FTIR spectrum presentes the stretching vibration of P–O–P at 710 cm $^{-1}$ and Si-O-(Si) vibration, (situated in the 1040-1200 cm $^{-1}$ range)



FTIR reflectance spectra from bioglass pellets before soaking, soaked in SBF for 12, 18, 24, 48 hours and from synthesized HA pellet.[14]

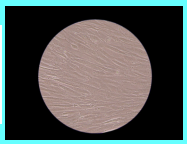


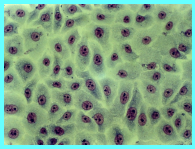
FTIR spectra from bioglass sample BIO 2

Main indicators concerning biocompatibilityare: cells number, proliferation, cells adherence to substrate, vitality, cells viability were obtained by MTT test.

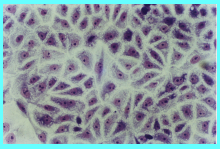
MTT Test results

Micrografs of osteoblast cells on sample BIO 2 (x100)

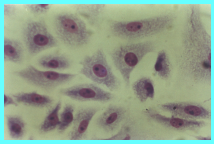




Vero cells in control sample



After 24 hours



Aftyer 72 hous

CONCLUSIONS

Were obtained homogeneous nanoamorphous materials.
The nano biomaterials good biocompatibility.

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