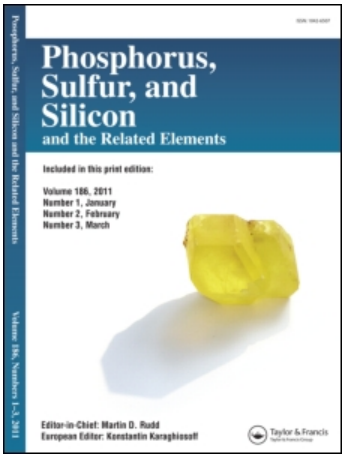

Phosphorus, Sulfur, and Silicon and the Related Elements
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713618290

Microstructual Changes of Stainless Steel Surface by Hydroxyapatite and Metal Alternate Electrochemical Plating

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Online publication date: 27 October 2010

To cite this Article Nakashima, Mikako , Shimizu, Hiroko , Monma, Hideki , Takahashi, Satoshi , Okura, Toshinori and Kosaka, Masao(2002) 'Microstructual Changes of Stainless Steel Surface by Hydroxyapatite and Metal Alternate Electrochemical Plating', Phosphorus, Sulfur, and Silicon and the Related Elements, 177: 8, 1923 — 1924
To link to this Article: DOI: 10.1080/10426500213383
URL: http://dx.doi.org/10.1080/10426500213383

Phosphorus, Sulfur and Silicon, 2002, Vol. 177:1923–1924

1042-6507/02 $12.00 + .00
DOI: 10.1080/10426500290094585

MICROSTRUCTUAL CHANGES OF STAINLESS STEEL SURFACE BY HYDROXYAPATITE AND METAL ALTERNATE ELECTROCHEMICAL PLATING

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(Received July 29, 2001; accepted December 25, 2001)

Calcium hydroxyapatite [$Ca_{10}(PO_4)_6(OH)_2$;HAp] coatings have been studied for a bioactive modification of stainless steel surface. HAp coatings are easily made on metallic substrates by electrolysis, however the coating layers become inevitably porous due to the generation of H_2 gas. In this study, we report that the pores were filled with metals by the additional electroplating of the metals.

An electrolyte named E_A for HAp coating was prepared by dissolving $Ca(H_2PO_4)_2{\cdot}H_2O$, $NaNO_3$, NaF, and nitric acid, and maintained at 80°C. The working electrodes were two platinum sheets, and plating electrode was stainless steel. First, a constant direct current at 10mA/cm^2 was passed for 5 min through the E_A for the deposition of

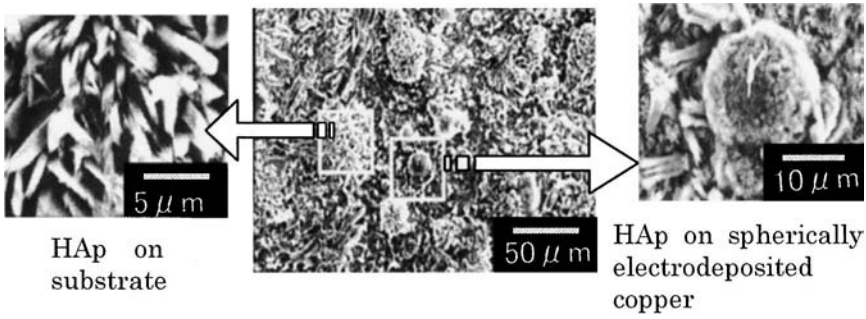

FIGURE 1 SEM micrograghs of electrodeposited HAp-copper-HAp multilayered coating. (pH of $E_A = 3.0$).

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HAp on the cathode substrate. Thus obtained HAp-coated substrates were treated as the cathode by electrolyzing solutions containing metal (M = Zn, Cu, or Fe) ions at 25°C under similar electrolysis conditions. Next, thus obtained cathode substrates were treated as the cathode by electrolyzing E_A again under the same conditions (Figure 1). The resulting HAp-metal-HAp multilayered coatings were characterized by SEM, XRD peak-separation analysis, and TF-XRD.