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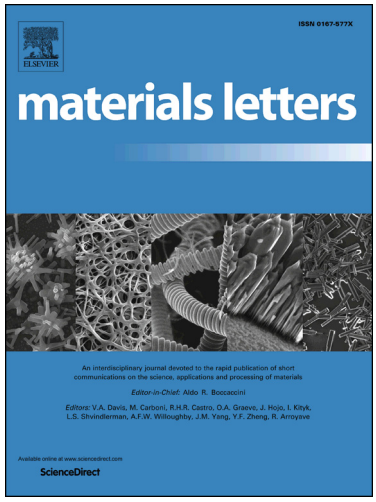


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# Low-temperature fabrication of Ag-doped HA coating on NiTi

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**Abstract**

NiTi is widely used as bone plates for fixation in bone fracture surgery. For such implant applications the bone plates are commonly coated with hydroxyapatite (HA) to facilitate osseointegration, and doped with silver (Ag) to impart an antibacterial function. In the present study these were achieved via a low-temperature route so as not to disturb the built-in thermomechanical properties of NiTi. An Ag-doped Ca-P coating was first formed on NiTi using AC electrodeposition in an electrolyte containing Ag, Ca, and P ions. The coated samples were subsequently hydrothermally treated at 180 °C for 24 hours to form HA. The coated samples were immersed in Kokubo's simulated body fluid (SBF) and release of Ag ions in regularly refreshed SBF was measured at regular intervals up to 32 days. It was found that the Ag ion release rate reached a steady value after two weeks, and the Ag ion concentration in the SBF stayed at around 1 μM, a value which is effectively antibacterial and yet non-cytotoxic according to the literature.

**Keywords:** Electrodeposition; Ag-doped HA coating; Ag ion release; Metals and alloys; Biomaterials; NiTi

## 1. Introduction

Metallic bone plates are widely used in bone fracture surgery for internal fixation. Implant loosening due to poor osseointegration and bacterial infection are two major causes of implant failure. Thus to increase the success rate of implantation, various methods have been developed to fabricate Ag-doped HA