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Volume Page

Keyword: [TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

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[\[Image PDF \(2140K\)\]](#) [\[References\]](#)**Surface Modification of Titanium with Hydrothermal Treatment at High Pressure**[Razia SULTANA](#)¹⁾, [Masayuki KON](#)²⁾, [Luciana M. HIRAKATA](#)³⁾, [Emi FUJIHARA](#)²⁾, [Kenzo ASAOKA](#)²⁾ and [Tetsuo ICHIKAWA](#)¹⁾

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Abstract:

Surface modification of titanium was investigated by means of hydrothermal treatment with a maximum pressure of 6.3 MPa (280°C temperature) in CaO solution or water to improve bioactivity and biocompatibility. As a result, calcium titanate was formed on the titanium surface. Moreover, titanium oxide and titanium hydroxide layers on the surface increased as temperature and pressure increased. The surface-modified titanium was also immersed in a simulated body fluid (SBF) to estimate its bioactivity. Needle-like apatite precipitation was observed on all hydrothermal-treated titanium surfaces after immersion in SBF for four weeks. In particular, the apatite precipitation of titanium treated with 6.3 MPa in CaO solution was clearer and larger in amount than those of all other hydrothermal-treated specimens. Further, the amount of precipitate corresponded to the thickness of the surface-modified layer and the amount of calcium in the surface layer. The results suggested that surface modification of titanium with high-pressure hydrothermal treatment seemed to

improve bioactivity and biocompatibility.

Key words:

[Titanium](#), [Surface modification](#), [Hydrothermal treatment](#)



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