Effect of Laser Surface Remelting on the Corrosion Resistance of 316L Orthodontic Brackets

Xiao-Yan ZHANG¹, Yong ZOU^{2,*}, Xiang-Long ZENG^{3,*}

¹ Department of Orthodontics, Beijing Stomatological Hospital, Capital Medical University, Beijing 100006, China

² Key Lab of Liquid Structure and Heredity of Materials, Ministry of Education, Shandong University, Jinan 250061, Shandong, China

³ Department of Orthodontics, School & Hospital of Stomatology, Peking University, Beijing 100081, China

*E-mail: yzou@sdu.edu.cn or zengxl@yeah.net

doi: 10.20964/110402877

Received: 12 January 2016 / *Accepted:* 17 February 2016 / *Published:* 1 March 2016

To improve its corrosion resistance from artificial saliva, 316L orthodontic brackets were subjected to surface modification by laser remelting. The experimental results showed that the passive films of 316L orthodontic bracket in artificial saliva have n-type semiconducting properties. The improvement of 316L orthodontic bracket corrosion resistance was found to depend on the laser power. Laser surface remelting decreased the amount of δ second phase in the 316L orthodontic bracket. However, only the appropriate laser power was found to improve its corrosion resistance. Moreover, high laser powers were unable to increase its corrosion resistance. The improved corrosion resistance of 316L orthodontic bracket was attributed to the refinement of its grain sizes and homogenization of its surface elements by laser remelting.

Keywords: Laser remelting; Passive film; Corrosion; Bracket

[FULL TEXT](#)

© 2016 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).