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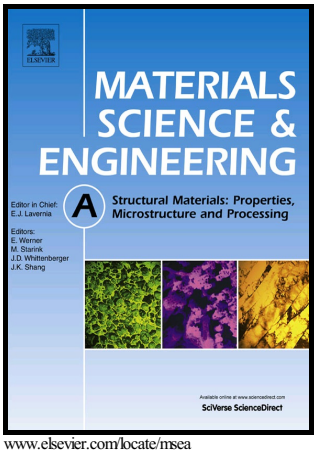

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Jing Li[a*], Jianzhong Zhou[a*], Aixin Feng[b,c], Shu Huang[a], Xiankai Meng[a], Yunhui Sun[a], Yunjie Sun[a], Xuliang Tian[a], Yu Huang[a]

[a]*School of Mechanical Engineering, Jiangsu University, Zhenjiang 212013, PR China；*

[b]*College of Mechanical & Electrical Engineering, Wenzhou University, Wenzhou, 325035, PR China；*

[c]*Zhejiang Provincial Key Laboratory of Laser Processing Robot/ Key Laboratory of Laser Precision Processing & Detection, Wenzhou, 325035, PR China.*

ljingvip@sina.cn

zhoujz@ujs.edu.cn

[*]Corresponding authors. Tel.: +86-0511-8878-0219; fax: +86-0511-8878-0219.

Abstract

The aim of this study was to investigate the influence of the synergistic function of cryogenic temperature and ultrahigh strain rate deformation during the process of Cryogenic Laser Peening (CLP) on the mechanical properties and microstructural evolution of TC6 titanium alloy. The measurements of tensile properties at room and elevated temperatures，as well as micro-hardness on the cross-sectional direction were carried out. Meanwhile, the microstructural evolution was characterizated by Electron backscattered diffraction (EBSD) analysis and Transmission Electron Microscopy (TEM) observation. The experimental results demonstrated that cryogenic laser peening could significantly improve the strength and ductility, as well as the stability at elevated temperature condition of TC6 titanium alloy. At the same time, cryogenic