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Zuoren Nie



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# Evolution Mechanism of Dislocation Boundary and Characteristic Micro-structure of Commercial Pure Titanium during the Projectile Impact

Tongbo Wang<sup>1</sup>, Bolong Li<sup>1\*</sup>, Yingchao Li<sup>1,2</sup>, Mian Li<sup>1</sup>, Zuoren Nie<sup>1\*</sup>

1. College of Material Science and Engineering, Beijing University of Technology, Beijing100124, China

2. CNNC Sufa Technology Industry Co. LTD, Suzhou215129, Jiangsu, China

**Abstract:** Dislocation boundary response and characteristic micro-structure were investigated in commercial pure titanium during the penetration impact and dynamic compression. The initial dislocation boundary induced by cold rolling can strengthen the adiabatic shearing sensitivity of commercial pure titanium during the penetration impact, which is consistent with the mechanical response and micro-structure during the dynamic compression. The compression with a loading direction vertical to the initial geometrically necessary boundaries (GNBs) results in the decrease in the spacing between GNBs, while the compression with a loading direction parallel to the initial GNBs attributes to the generation of new dislocation boundary crossed with the initial one. Then, a model of distribution and morphology of dislocation boundary around crater is proposed.

**Keywords:** Initial dislocation boundary; adiabatic shear sensitivity; GNBs;

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Corresponding author at: College of Material Science and Engineering, Beijing University of Technology. Tel: +86 010 673924968

Emails addresses: blli@bjut.edu.cn, zrn timer@bjut.edu.cn

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