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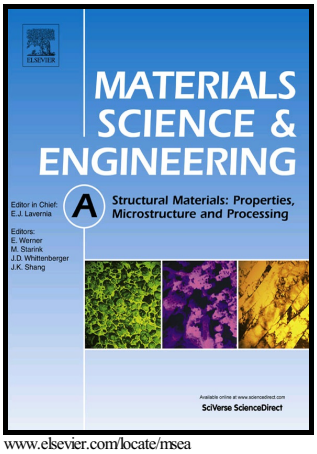

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Evolution Mechanism of Dislocation Boundary and Characteristic Micro-structure of Commercial Pure Titanium during the Projectile Impact

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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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