

# Investigation of retained austenite morphology-dominated hardening and fatigue behavior in bainitic steel during wear process

Quan Shan<sup>1</sup>, Sida Chen<sup>1</sup>, Xiedong Huang<sup>1</sup>, Zexin Liao<sup>1</sup>, Zulai Li<sup>1</sup>, and Hong Wu<sup>2</sup>

<sup>1</sup>Kunming University of Science and Technology

<sup>2</sup>Central South University State Key Laboratory of Powder Metallurgy

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## Abstract

This study aims at revealing the relationship between retained austenite (RA) morphology, deformation-induced transformation (DIPT) behavior and surface wear behavior. The hardening and fatigue behavior during wear of continuous film-like RA (CFRA), blocky RA (BRA), discontinuous film-like RA (DFRA) and point or flocculent RA (PRA) achieved through different tempering process was investigated using quasi-in-situ fatigue test and impact abrasive wear test. RA morphology exhibited a significant influence on hardening and fatigue behavior during wear. CFRA exhibited the best wear properties, owing to its excellent fatigue performance and hardening capacity. The BRA displayed relative high wear performance, with adequate hardening capacity but weak fatigue performance. DFRA demonstrated comparable wear resistance to BRA due to better fatigue performance. PRA exhibited deficient wear performance due to insufficient fatigue properties and low work hardening ability.

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