

ELECTROCHEMICAL BORIDING AND CHARACTERIZATION OF AISI 1020 STEEL

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Abstract

In this study, tribological properties of borided 1020 steel were investigated with reciprocating tests under dry sliding conditions with a ball-on-flat geometry. For boriding, a new electrochemical based boriding called as CRTD-Bor (Cathodic Reduction and Thermal Diffusion based boriding) was chosen. CRTD-Bor was performed in borax based electrolyte composing of 90% borax ($\text{Na}_2\text{B}_4\text{O}_7$) and 10% sodium carbonate (Na_2CO_3) at the constant current density of 200 mA/cm^2 and the temperature of $950 \text{ }^\circ\text{C}$ for a short period of 15 min. The borided surface demonstrated much superior wear performance compared to the base 1020 steel.

Keywords: Boriding, CRTD-Bor, Tribological Properties, Steel