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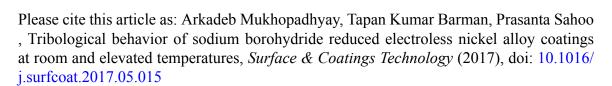
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Tribological behavior of sodium borohydride reduced electroless nickel alloy coatings at

room and elevated temperatures

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Abstract

The present work investigates and compares the tribological behavior of sodium borohydride

reduced electroless Ni-B, Ni-B-W and Ni-B-Mo coatings at room temperature (25°C), 100°C,

300°C and 500°C. A typical nodulated surface morphology with amorphous structure is observed

for the EN binary and ternary alloy coatings. Deposition of W along with Ni-B results in

improved microhardness and tribological behavior at room temperature, 100°C and 300°C along

with excellent thermal stability. But the highest resistance to wear is exhibited by Ni-B-Mo

coatings at 500°C test temperature due to a protective tribo-oxide layer formation consisting of

oxides of nickel and molybdenum. Depending on the test temperature, the wear mechanism is

also seen to vary with the tribological behavior being controlled by in-situ phase transformation,

formation of tribo-oxide layers as well as mechanically mixed layers.

Keywords: Electroless; Ni-B; Ni-B-W; Ni-B-Mo; wear rate; COF; high temperature

1. Introduction

The last few decades have experienced tremendous achievements in the field of hard surface

coatings deposited by the electroless method due to its enhanced corrosion resistance, wear

resistance, low coefficient of friction (COF) as well as excellent physical and mechanical

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