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Arkadeb Mukhopadhyay, Tapan Kumar Barman, Prasanta Sahoo



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## **Tribological behavior of sodium borohydride reduced electroless nickel alloy coatings at room and elevated temperatures**

Arkadeb Mukhopadhyay, Tapan Kumar Barman, Prasanta Sahoo\*

Department of Mechanical Engineering, Jadavpur University, Kolkata – 700 032, India

\*Corresponding author (Email: psjume@gmail.com, Fax: +91 33 2414 6890)

### **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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