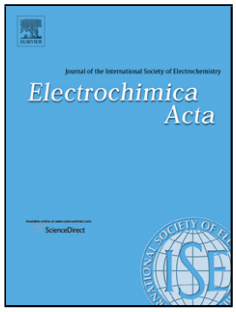

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Formation and characterization of multilayers borohydride and hypophosphite reduced electroless nickel deposits.

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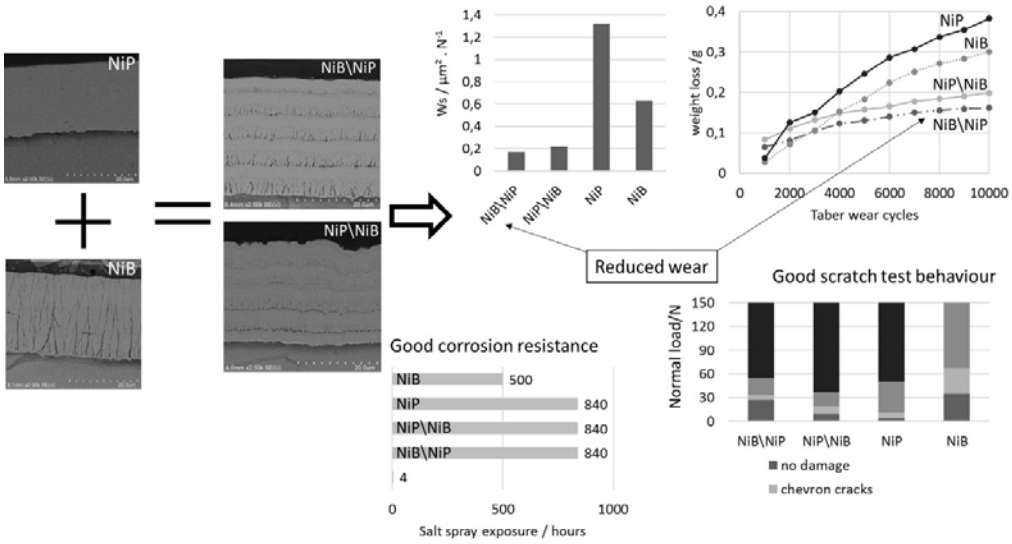
Graphical abstract



Research Highlights

- Multilayer electroless nickel coatings with 5 layers of NiP and 5 of NiB were synthesized.
- Taber wear Index of multilayer coatings was 2 to 3 times lower than for monolayers
- Specific wear rate of multilayer coatings was decreased by a factor 3 to 5 compared to monolayers
- Corrosion resistance of multilayer coatings was better than monolayer nickel-boron
- Scratch test behavior of mulitilayer coatings was similar to that of nickel-phosphorus.

Electroless nickel coatings are popular surface treatments for industrial application because they can provide either excellent corrosion protection (in the case of nickel-phosphorus – Ni-P – coatings) or excellent wear resistance and superficial hardness (in the case of nickel-boron – Ni-B – coatings). The properties provided by both types of coatings are thus complementary and recent work has focused on combining electroless Ni-P and Ni-B in the form of duplex coatings. This work goes further on this research by studying multilayer electroless Ni-P/Ni-B coatings. The Ni–P/Ni–B multilayer coatings were prepared using a commercial bath for the Ni-P coatings and a lab-developed alkaline bath based on sodium