Synthesis and characterization of Ni-P/TiC composite coating through one step co-electrodeposition

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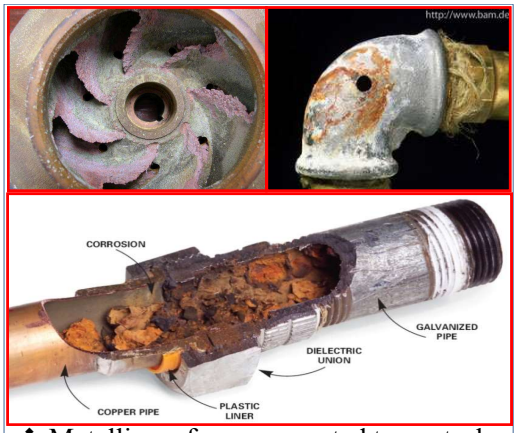
Abstract

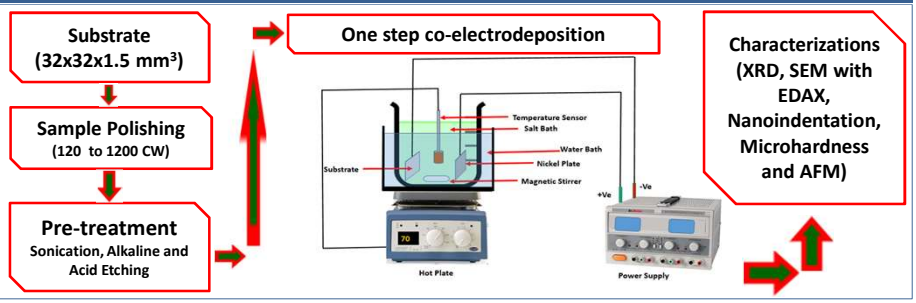
- NiP coatings are well known for their anticorrosive behavior but lack mechanical strength.
- In the present study, the effect of sub micron scale TiC particles on the structural, morphological , mechanical and electrochemical analysis of Ni-P/TiC coating were studied
- Co-electrodeposition of the Ni-P/TiC with varying the composition of TiC namely 0.5, 1.0, 1.5 and 2.0g/L. The surface of the coat represents nodular structure without any defects.
- Vickers microhardness is observed to increase with the composition and attains highest value at 1.5g/L of TiC.
- The improvement in mechanical properties of the Ni-P coating is achieved without adversely effecting its corrosion resistance.

Corrosion Damages

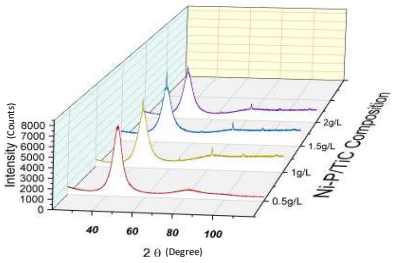


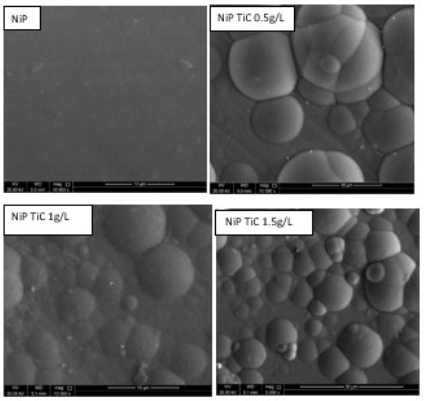
- ❖ Metallic surfaces are coated to control deterioration due to “corrosion”.
- ❖ Corrosion and wear results in decrease plant efficiency and safety concerns.
- ❖ 40% of total cost which is billions of dollars can be saved by utilizing proper corrosion prevention techniques.

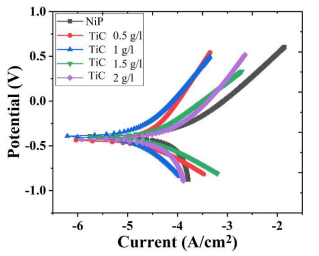
Methodology

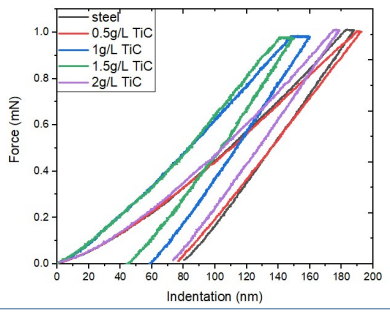


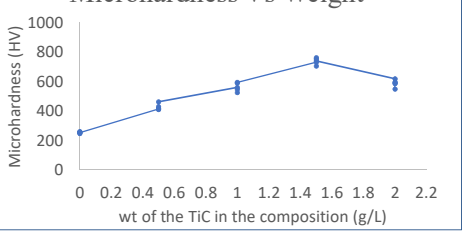
Results











Conclusion

- Ni-P/TiC composite coatings were successfully developed through an electrodeposition process.
- Incorporation of TiC sub-micron particles to the Ni-P matrix has a significant influence on its structural, surface and mechanical properties.
- Ni-P/TiC composite coatings show improved surface and mechanical properties as compared to Ni-P.
- Ni-P/TiC composite coatings is attractive for many industries.

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