

Ni-P-ZrC Nanocomposite Coating with Enhanced Corrosion Resistance and Mechanical Properties

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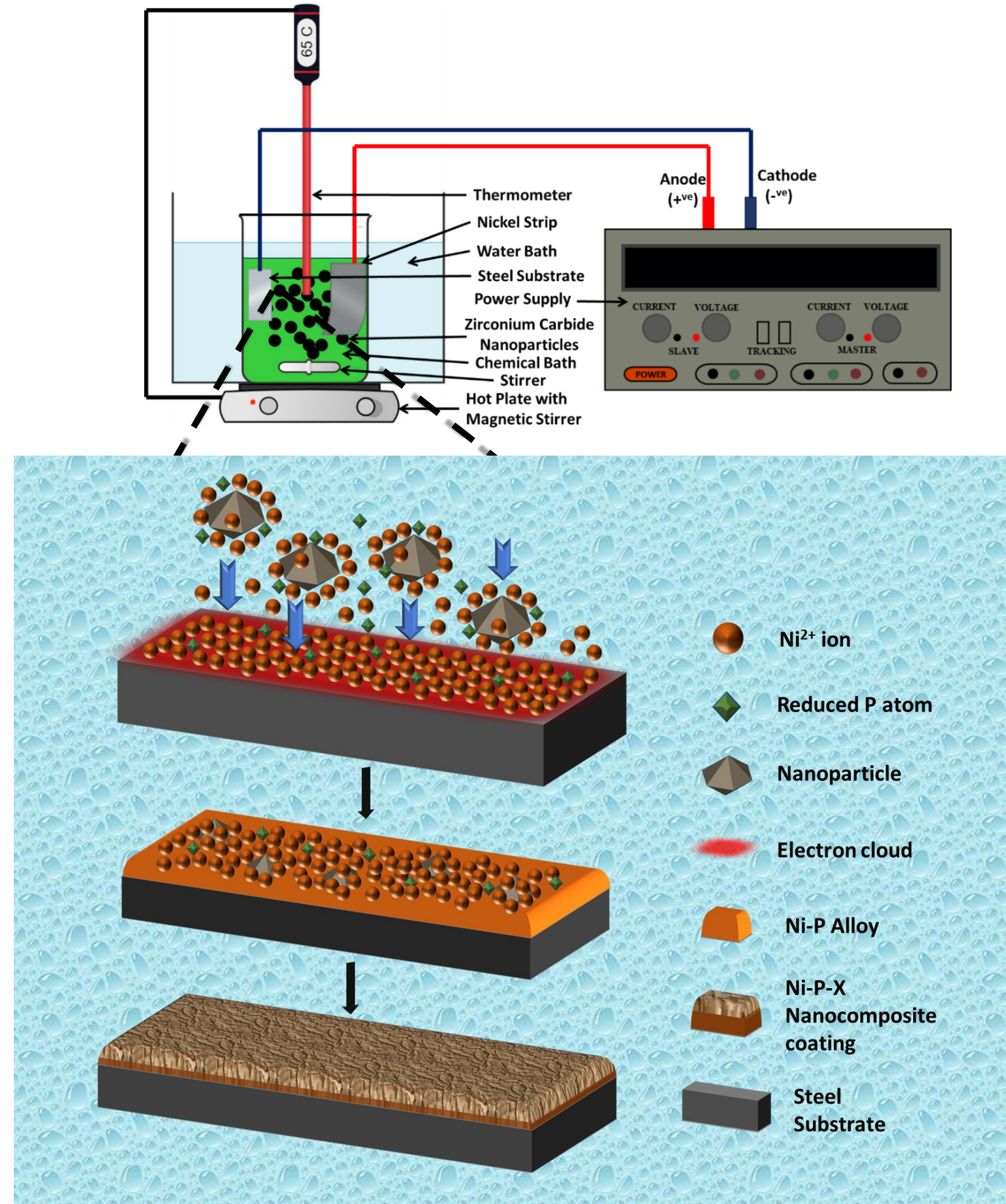
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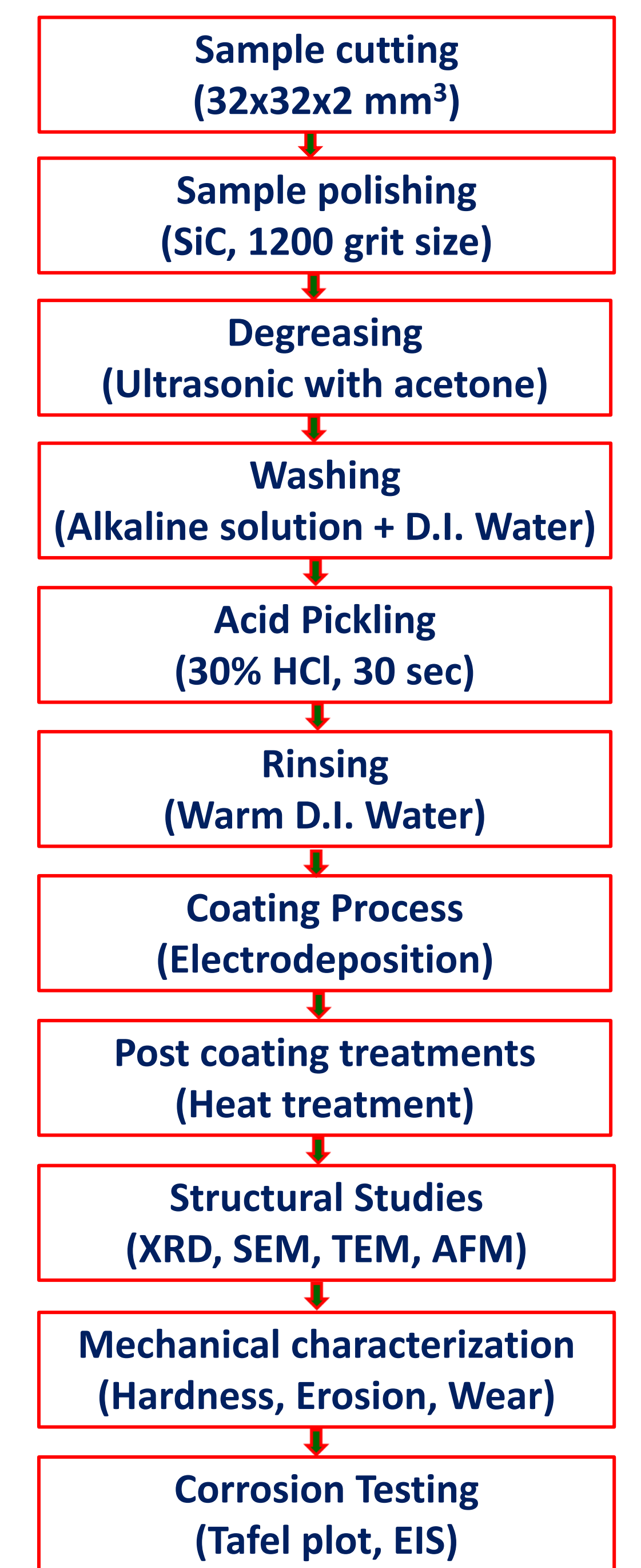
ABSTRACT

- Corrosion is regarded as the slow poison for the metallic structures costing billions of dollars by affecting various industries.
- Ni-P coatings are well known for their corrosion resistance behavior but lack mechanical strength.
- In the present study, the effect of nano ZrC particles on the structural, morphological, mechanical and electrochemical analysis of Ni-P-ZrC nanocomposite coating were studied..
- Incorporation of ZrC nanoparticles within Ni-P matrix has improved the morphology, enhanced the mechanical properties and increased the corrosion resistance of the nanocomposite coating.
- The most suitable results for microhardness, wear, and erosion testing were observed at 0.75g/L of ZrC in the chemical bath.

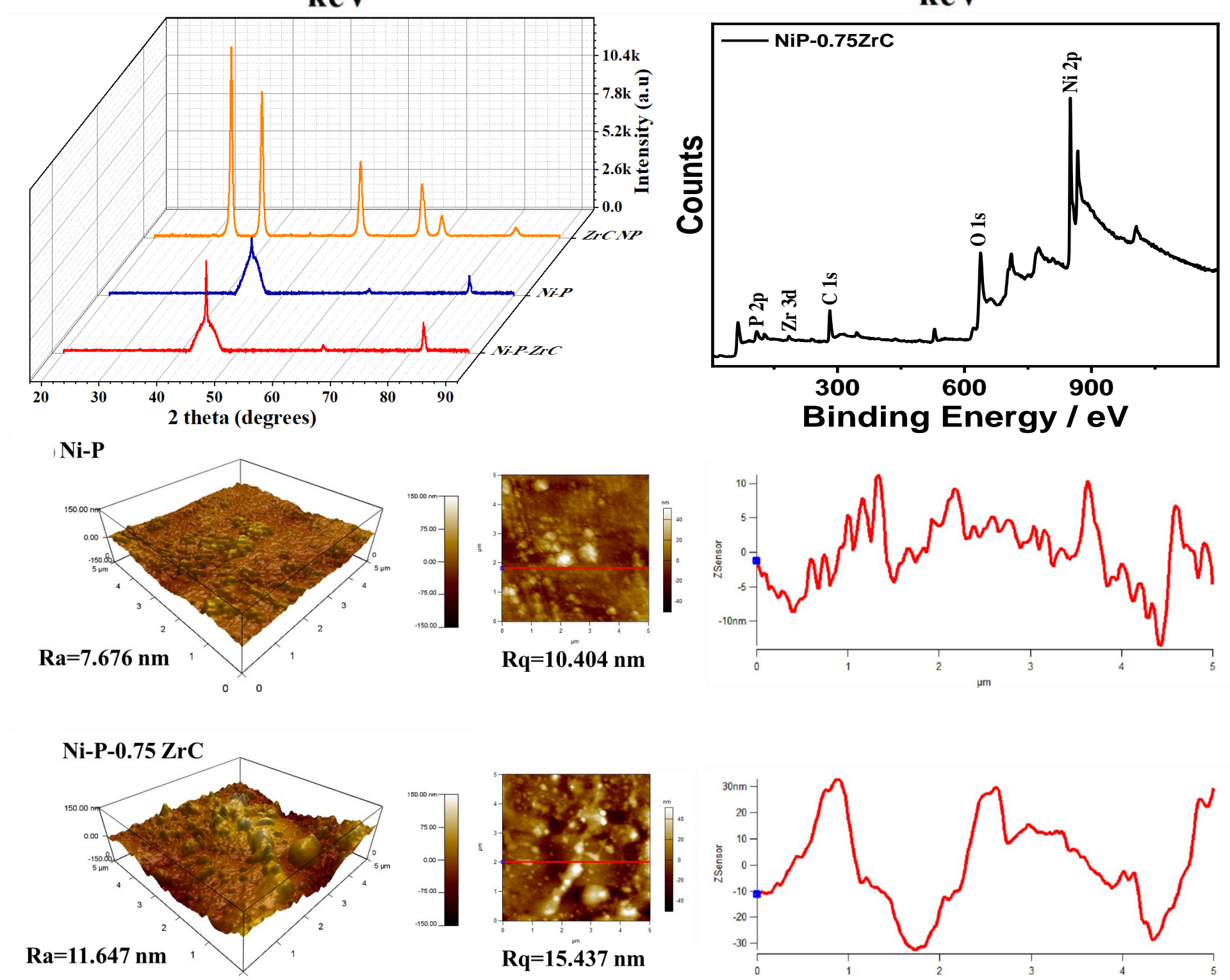
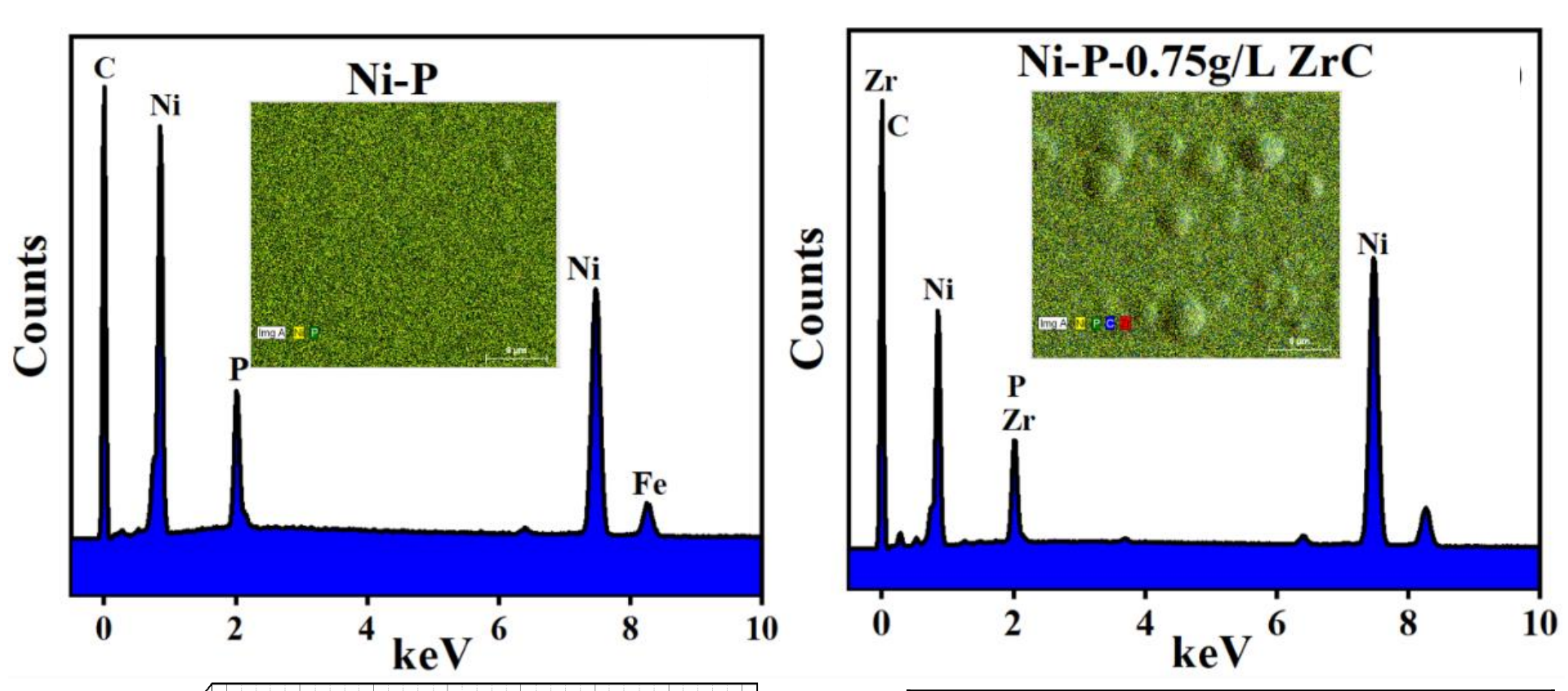
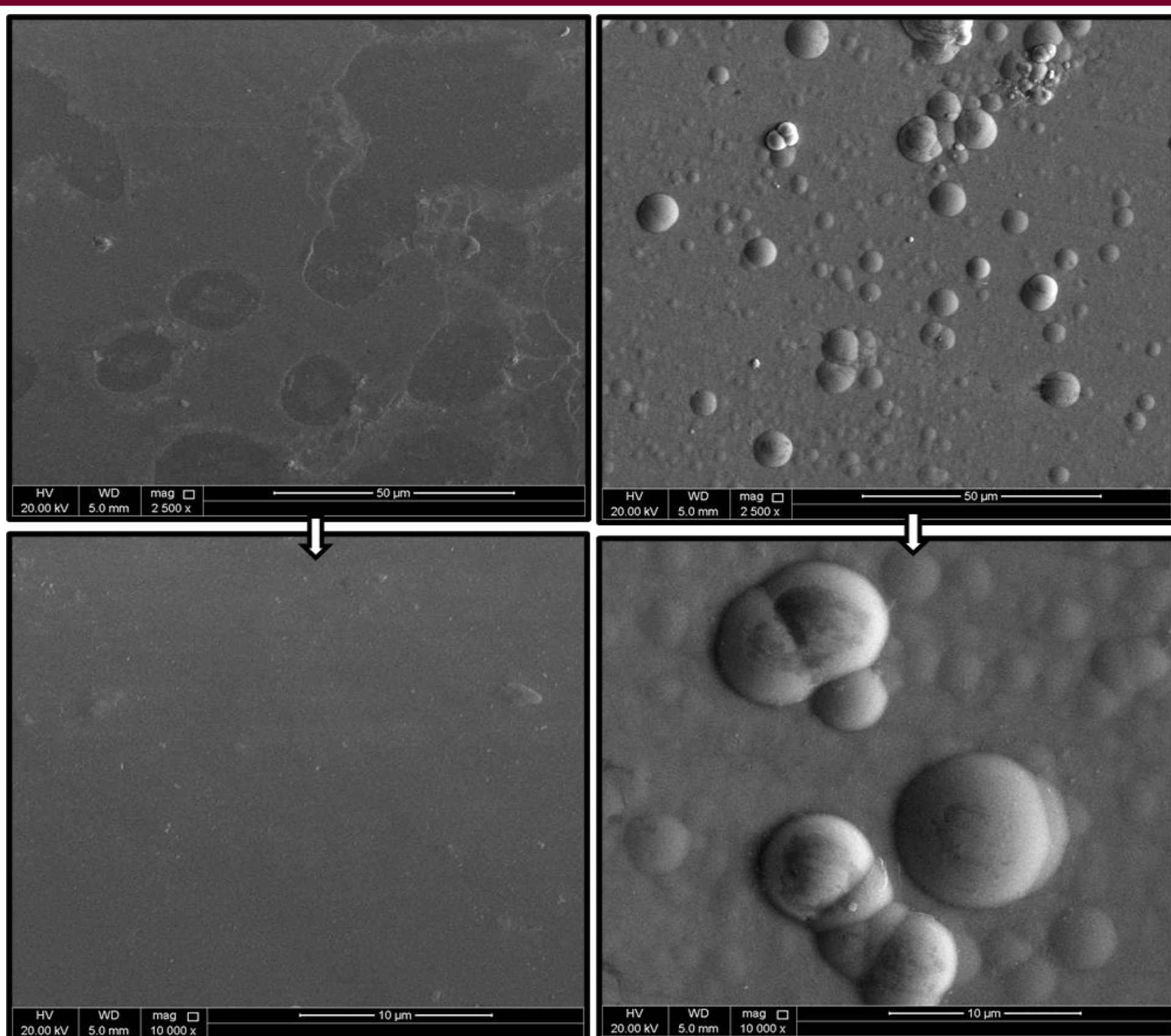
METHODOLOGY & DEPOSITION MECHANISM



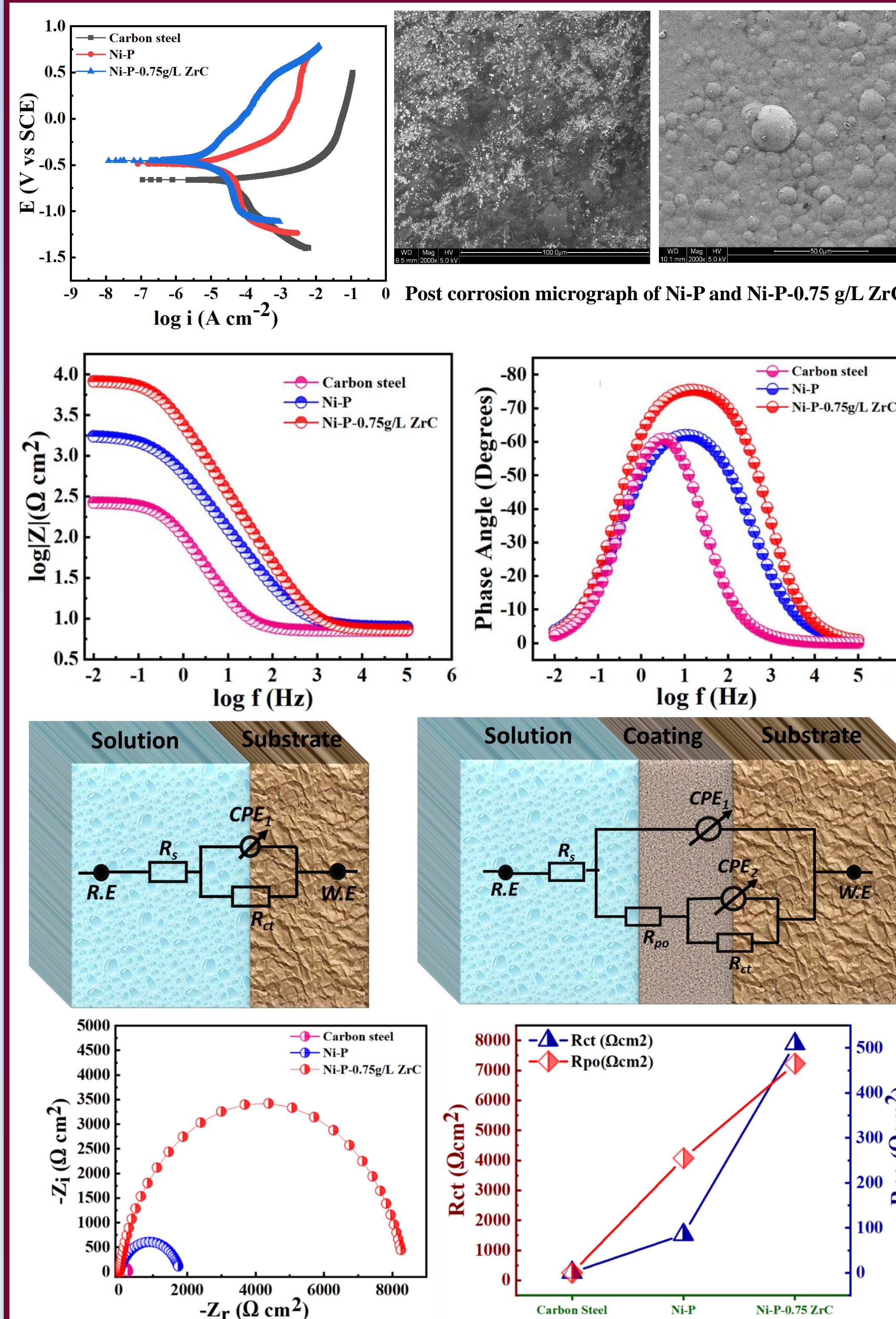
Process Flow Chart



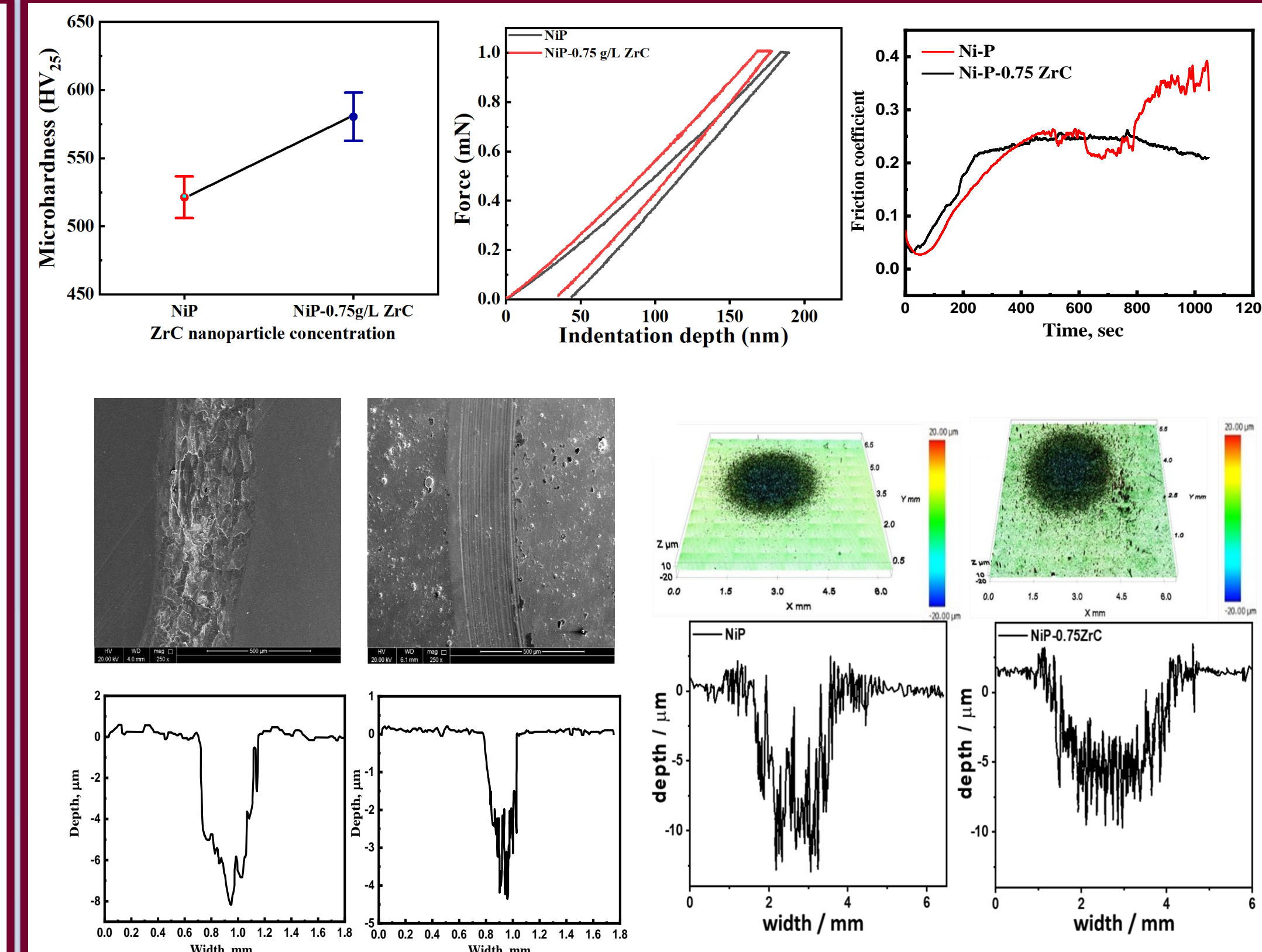
MORPHOLOGICAL RESULTS



CORROSION PERFORMANCE



MECHANICAL PROPERTIES



CONCLUSION

- Ni-P-ZrC nanocomposite coatings were successfully developed through an electrodeposition process.
- Incorporation of ZrC nanoparticles to the Ni-P matrix has a significant influence on its structural, surface and mechanical properties.
- Ni-P-ZrC nanocomposite coatings possesses 85% more corrosion resistance than normal steel.
- Ni-P-ZrC nanocomposite coatings is attractive for many industries.