

**Title:**

Mechanical and Microstructural Characterization of Electroless Deposition Nickel-Phosphorus on Carbon Steel

**Journal:**

Advanced Structured Materials, Volume 174, 2022.

**Document Type:**

Book Chapter

**Authors:**

Nur Haznieda Hazali,

Nur Aqilah Jailani,

Azrina Arshad, [azrinaa@unikl.edu.my](mailto:azrinaa@unikl.edu.my)

Azzafeerah Mahyuddin. [azzafeerah@unikl.edu.my](mailto:azzafeerah@unikl.edu.my)

**Full text link:**

Publisher :

[https://www.researchgate.net/publication/360986850\\_Mechanical\\_and\\_Microstructural\\_Characterization\\_of\\_Electroless\\_Deposition\\_Nickel-Phosphorus\\_on\\_Carbon\\_Steel](https://www.researchgate.net/publication/360986850_Mechanical_and_Microstructural_Characterization_of_Electroless_Deposition_Nickel-Phosphorus_on_Carbon_Steel)

**Scopus preview:**

[https://www.scopus.com/record/display.uri?eid=2-s2.0-85131309524&doi=10.1007%2f978-3-031-01488-8\\_33&origin=inward&txGid=c43f45b13c4731ef441c36e53e39c6b0](https://www.scopus.com/record/display.uri?eid=2-s2.0-85131309524&doi=10.1007%2f978-3-031-01488-8_33&origin=inward&txGid=c43f45b13c4731ef441c36e53e39c6b0)

**Abstract:**

Pipelines in thermoelectric power plants run under extreme mechanical and chemical conditions that can result in catastrophic failure. Electroless nickel-phosphorus (Ni-P) coatings surpass other commercially available coatings in terms of corrosion resistance and hardness for power plant pipelines. Electroless coating deposition does not require any electricity for its operation and having a uniform coating. In the present work, Ni-P was successfully deposited on carbon steel using the electroless deposition method. Effect of coating parameters on microstructure evolution and mechanical properties were investigated by scanning electron microscope (SEM) and micro Vickers hardness test. The corrosion behavior was evaluated by hot corrosion test in Na<sub>2</sub>SO<sub>4</sub>. The results showed a noticeable improvement in the workability of the coated sample immersed in 80 °C temperature electroless deposition and 5.0 pH of Ni-P with a constant of speed, 200 rpm throughout the experiment. These findings confirm that Ni-P coating successfully coated on carbon steel, could significantly reduce the porosity percentage, increased the hardness, and lead to improvement in corrosion resistance of Ni-P coatings as compared to uncoated samples.