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September 2023

Developing Anti-Corrosion Coatings for Metal Infrastructure

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Citation of this paper:

Bosso, Jessica, "Developing Anti-Corrosion Coatings for Metal Infrastructure" (2023). *Inspiring Minds – A Digital Collection of Western's Graduate Research, Scholarship and Creative Activity*. 508.

<https://ir.lib.uwo.ca/inspiringminds/508>

Developing Anti-Corrosion Coatings for Metal Infrastructure

The corrosion of large-scale infrastructure costs the Canadian government \$66 billion annually, spent on maintenance and repairs alone. Since we live in an oxidizing atmosphere, protective coatings are typically applied to metal surfaces, limiting their exposure to potentially corrosive conditions. Current coatings are often chromium-based and pose significant hazards to human and environmental health, as well as exhibit limited stability over long periods of time. My research focuses on the development of an adhesive layer between the metal and topcoat that anchors the materials together, lengthening the lifetime of the coatings and ultimately the infrastructure beneath. I synthesize a variety of organic molecules that arrange in neatly packed, strong layers on metal surfaces and coat metallic substrates with the release of harmless by-products. Through the development of more robust anti-corrosion coatings, we can implement more effective preventative measures and reduce the cost of corrosion maintenance in Canada.