Researchers patent process that binds organic compounds to metal surfaces

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Queen's University researchers Cathleen Crudden and Hugh Horton (Chemistry), along with students, postdoctoral fellows and other collaborators have developed a new process that allows organic compounds to bind to metal surfaces. This cutting-edge technology is now being patented and commercialized by PARTEQ and Green Centre Canada.

"Imagine pouring vegetable oil onto a metal surface and expecting it to stay," says Dr. Horton. "We have created a bond through a chemical absorption process that would allow that to happen."

The first example of the formation of organic monolayers (single molecule-thick coatings) on metals was published about 30 years ago and ignited huge interest in the scientific community. The technique forms the basis for a wide range of biosensing applications using modified metal surfaces. However these coatings lack robustness and are sensitive even to exposure to air, greatly limiting their applications and making the technique expensive.

Drs. Crudden and Horton are the first in the world to develop a viable alternative to this initial process. In their strategy, the bond between the metal and the organic coating occurs through carbon instead of sulfur, which gives much greater strength and resistance to oxidation.

Common, everyday uses of this technology could include applying organic coatings to automotive surfaces that would protect them from

corrosion and decrease friction. The use of these coatings to improve commercial biosensors for medical diagnostics is already underway.

The research was published in *Nature Chemistry*.

More information: "Ultra stable self-assembled monolayers of N-heterocyclic carbenes on gold." Cathleen M. Crudden, et al. *Nature Chemistry* (2014) DOI: 10.1038/nchem.1891. Received 08 November 2013 Accepted 11 February 2014 Published online 23 March 2014

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