Natural Sciences and Engineering Research Council of Canada

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Award Details

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High-level characterization of the effects of de-icing salts on polymer composite insulator shed hydrophobicity and monomer leakage

Research Details

Competition Year:	2016	**Fiscal Year:**	2016-2017
Project Lead Name:	Wulff, Jeremy	**Institution:**	University of Victoria
Department:	Chemistry	**Province:**	British Columbia
Award Amount:	$25,000	**Installment:**	1 - 1
Program:	Engage Grants Program	**Selection Committee:**	Pacific Internal Decision Committee
Research Subject:	Materials science and technology	**Area of Application:**	Energy resources (including production, exploration, processing, distribution and use)
Co-Researchers:	No Co-Researcher	**Partners:**	ASAsoft (Canada) Inc.

Award Summary

There is a need to evaluate the long-term effects of corrosive conditions (particularly the use of de-icing salts) on the hydrophobicity of silicone used on polymer composite electrical insulators.
The present application seeks funds to support a collaboration between AsaSoft Canada (a prominent manufacturer of these insulators) and the Wulff research group at the University of Victoria. Briefly, a co-op student jointly supervised by Prof. Wulff and the CEO of AsaSoft, Rajkumar Padmawar, will use a variety of analytical methods that are very familiar to researchers in Wulff's laboratory, to better understand the effects of simulated ageing on samples of AsaSoft's polymer insulator covers.
These methods include: (1) visual microscopy and atomic force microscopy to determine changes to surface morphology; (2) contact angle measurements to quantify changes in hydrophobicity; and (3) NMR and mass spectrometry measurements to characterize low-molecular weight silicone oils leaking from the polymer matrix.
By applying modern, scientifically rigorous and statistically sound characterization methods to the problem of polymer insulator ageing (which has previously been studied only by very low-tech methods), we expect to make a substantial and lasting contribution to the field of non-ceramic insulators. This will ultimately encourage a greater adoption of these more modern devices, leading to substantial savings in transportation, storage, installation and operating costs. Because polymer-based insulators have a lower greenhouse-gas footprint than traditional ceramic or glass insulators, we also anticipate that our research will yield a net reduction in greenhouse gas emissions associated with product manufacture.

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