

Electrochemical studies simulating corrosion of nickel-base alloys in thin layers of particulate

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Highly corrosion-resistant, nickel-chromium-molybdenum Alloy 22 is designated for use for containment of high-level nuclear waste at the proposed Yucca Mountain Repository. At the University of Toronto and several other North American universities, background scientific studies are in progress to improve our understanding of the possible corrosion mechanisms that might affect this class of alloys. We are using less-resistant alloys, beginning with binary Ni-22Cr, to study the stability of localized corrosion, such as pitting, in thin layers of moist dust. Relative humidity and temperature are controlled. The arrangement of miniature sensor electrodes (NiCr, Pt, Ag/AgCl) to carry out meaningful electrochemistry in thin layers has been optimized. Various possible pitfalls in such measurements have been identified. The effect of nitrate ion on corrosion behaviour in thin layers of particulate is compared with its effect in bulk liquid environments, and the differences quantified and explained.

Roger Newman's lab group at the University of Toronto are planning to attend the 55th Canadian Chemical Engineering Conference being held in Toronto this fall. Attached is the abstract required by the Canadian Society for Chemical Engineering.