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Evaluation of copper as the corrosion barrier for nuclear waste containers

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Evaluation of copper as the corrosion barrier for nuclear waste containers

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Copper is a remarkably corrosion-resistant metal and will be used as the corrosion barrier for used nuclear fuel containers. Used fuel containers are a part of the Canadian design for the safe disposal of nuclear waste in a deep geological repository (DGR). In the DGR, salts, humidity, and high temperature will be present and will provide the conditions for corrosion to proceed. I use quartz crystal microbalance (QCM) and resistance probe techniques to investigate the corrosion behavior of copper under DGR conditions. A QCM is a kind of balance that uses the change in frequency of a copper-coated quartz crystal to detect mass changes on the nanogram scale. I use a resistance probe to measure the change in electrical resistance of a copper element to detect thickness changes due to corrosion. This research aims to verify the capability of copper to resist corrosion for the specified period (1,000,000 years).