

## Corrosion in Nuclear Waste Containers

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One of the challenges for the continued use and expansion of nuclear power generation is the disposal of radioactive waste materials. Meeting the required lifetimes of thousands of years requires the identification of stable geological formations with non-aggressive environments combined with engineered multi-barrier containment systems.

Since water and oxygen tend to promote corrosion, geological locations that are either dry or low in oxygen are desired. Dry conditions are present above the water table, but oxygen is available, while the oxygen content is low below the water table, but the soil is saturated and water is present. The differences in conditions affect the corrosion of the structural materials as well as that of the fuel materials in the case of a breach in the container.

The long lifetimes required for the storage of nuclear waste require the use of accelerated tests or extrapolation of shorter term experiments, both of which increase uncertainty, since the degradation mechanism may change as a function of environmental conditions or time. Another approach is to use the analysis of archeological samples to understand the corrosion behavior during long exposures.

In this paper, the corrosion behavior of materials used for containment systems for storage of nuclear waste in geological sites will be reviewed. This will include comparison of the performance of different types of materials and the effects of different environmental conditions.