



COMAS Chloé

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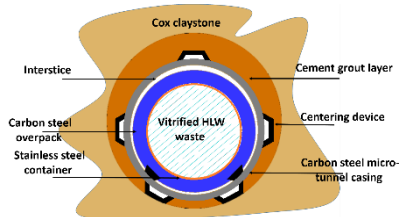
Monitoring and control of steel components' corrosion for geological radioactive disposal

Institut de la Corrosion
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Context

CIGEO – Industrial Centre for Geological Disposal

Intermediate Level Long-Lived waste (ILL-LW)
High Level Waste (HLW) involving a multi-barrier concept



Monitoring of many corrosion modes which may appear under geological disposal conditions

- To reproduce in laboratory many corrosion modes with sizes and geometries of damages and corrosion rates representative of geological disposal conditions;
- To test the ability of acoustic emission and electrochemical techniques to detect and quantify the corrosion.

Method and tools

Review

Bibliographic review of corrosion damages and corrosion rates appearing in geological disposal conditions using Andra's informations.

Simulation of corrosion damages

To find experimental setups and procedures in order to define many geometries of damages and corrosion rates representative of geological disposal conditions according to the bibliographic review.

Monitoring of many corrosion modes

To monitor different simulated corrosion modes by:

- acoustic emission;
- open circuit potential;
- linear polarization resistance;
- electrochemical impedance spectroscopy;
- electrochemical noise;
- harmonic distortion analysis.

Results

Uniform corrosion under porous deposit

- corrosion rate: μm to mm/year ;
- experimental setups: NaCl solutions saturated by CO_2 solutions.

Heterogeneous corrosion under deposit

- proliferation of corrosion products;
- size damages: mm to cm ;
- experimental setups: cement/clay solutions.

Corrosion cavernouse

- size damages: mm to cm ;
- experimental setups: $\text{NaHCO}_3 + \text{NaCl}$ solutions.

Localized corrosion

- size damages: μm to mm ;
- experimental setups: solutions $\text{Ca}(\text{OH})_2 + \text{NaCl}$.

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