Carbon Dioxide Removal Atmosphere Airtight Room

Background

In the sub-surface disposal of low-level radioactive waste, a facility design that aims for the low diffusion and sorption of a radioactive nuclide is considered by its cementituous material, which is one of the engineered barriers.

The long-term evaluation of cementituous material is the one of the most important current issues. Cementituous material that shows high alkalinity easily reacts with the carbon dioxide contained in the atmosphere and deteriorates gradually inside, from the surface.

Thus, we consider it necessary to exclude the carbon dioxide, which causes the deterioration of cementituous material over a short period of time, comparatively, in the evaluation of low diffusion and sorption.

Outline

Therefore, an airtight-controllable room with an atmosphere absent of carbon dioxide to the furthest degree possible for the purpose of the handling-related improvement in an examination was installed.

This room consists of low-concentration CO_2-generating equipment and an airtight constant temperature and humidity room, and serves as a system for dry air, through which removal refining was carried out to 10 ppm or less in carbon dioxide with low-concentration CO_2-generating equipment after temperature and relative humidity adjustment.

Specifications

In the airtight constant temperature and humidity of a room with reduced carbon dioxide concentration, the diffusivity measurement examination and long-term high-temperature load test of the cementituous material can be carried out.

(1) Low-concentration CO_2-generating equipment
Equipment for refining a CO_2 concentration of 10 ppm or less: CO_2 main removal equipment, compressor, air tank, activated carbon tub, CO_2 concentration sensor

(2)Equipment for an airtight constant temperature and humidity room – temperature: 20±2℃ and relative humidity 60±5%: Air conditioner, temperature and relative humidity sensor

【Installed location and date】

Abiko area/May 2011

Photo 1: Appearance of an airtight constant temperature and humidity room, along with the control and monitoring apparatus

Photo 2: Appearance of low-concentration CO_2-generating equipment