Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

HRE031-21 Room:303 Time:May 24 15:15-15:30

Visualization technique of CO2 storage mechanisms using X-ray computed tomography

Yukihiro Yazaki[1*], Shun Chiyonobu[1], Ziqiu Xue[1]

[1]RITE

Carbon Capture and Storage (CCS) is one of the useful means to reduce CO2 to the atmosphere. The captured CO2 gas in industrial and energy-related sources is injected into deep geological formations. In order to assess the long-term risk of injected CO2, it is necessary to elucidate the storage mechanisms, such as geological characteristics and movement of CO2.

We show the visualization technique of CO2 storage mechanisms using a medical X-ray computed tomography (CT). X-ray CT is a medical imaging method employing tomography created by computer processing and can produce a three-dimensional image of components both externally and internally.

1) Characterization of geological formations

Basic properties, such as pore shape, pore size distribution and porosity, are usually determined by cutting samples from the whole core. These analyses are suitable for complex reservoir characterization. On the other hand, the X-ray CT scanner is a powerful tool for nondestructive analysis of geological materials. Utilization of conventional core analysis and CT scanning will make possible accurate evaluation of rock properties and geological formations.

2) Elucidation of CO2 flow and transport processes

The effectiveness of geological storage depends on a combination of physical process (e.g. residual CO2 gas trapping) and geochemical processes of solubility trapping and mineral trapping. Therefore, we have to develop a greater understanding of these trapping mechanisms. Experiments of residual gas trapping are conducted with X-ray CT scanning. These experiments are designed to allow monitoring the evolution of trapped gas over time (4-D). Measurements of gas-water saturation with geophysical properties will be undertaken in this study.