A proposal of CO2 underground storage using hydrate

*Takaomi Tobase¹

1. Electric Power Development Co., Ltd.

There is a fact that methane exists naturally and stably in the form of hydrate (solid). As natural analog with methane hydrate, form CO2 hydrate using gas hydrate mechanism based on temperature and pressure, propose that could also be applied to underground storage of CO2. The concepts of the CO2 hydrate storage are as follows.

(1) Injection liquid or supercritical CO2 in the storage layer.
(2) Injected CO2 moves above by a density difference, when temperature and pressure condition reached the domain that formed hydrate, make clogging in a pore (come to have seal function).
(3) CO2 becomes able to storage under layer of CO2 hydrate having seal function. (not need the cap rock as geological structure)

As a result of investigating the temperature in the surrounding sea area of Japan, we confirm that temperature and pressure condition to form CO2 hydrate in the underground of sea bottom. It is thought that very likely to be the CO2 hydrate storage.

Aquifer storage (including CO2-EOR) to have the cap rock as a method of the CO2 storage is popular. But if CO2 hydrate storage is realized, we can hope that contribute to right lot expansion of the CO2 storage.

Keywords: carbon storage, gas hydrate, seal function