Study for the mechanism to the effect of improvement of CO_2 storage efficiency by micro bubble injection technology

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Reducing cost of CO_2 injection and storage is important challenge for applying to commercialization. It is very important to establish the advanced CO_2 dissolution technology which controls the reservoir pressure during CO_2 injection to inject and store CO_2 in reservoir efficiently. In this study, we focused the technology of CO_2 injection as the microbubble (MB) and have proceeded the unraveling the efficiency of increase of CO_2 storage and the mechanism by MB-CO_2 from experiment and flow simulation to apply to CCS fields.

From core flooding test by using Berea sand stones with length of 7cm and 30 cm, it was indicated that not only CO_2 saturation was increased but CO_2 Storage was increased in core and CO_2 dissolution to water was advanced by MB-CO_2 injection technology. Moreover, CO_2 was injected in area of small pore size, in which it was difficult to inject by normal injection technology, by MB-CO_2 injection technology.

We proceed to make the 3D flow simulation model based on core flooding tests by normal and MB CO_2 injection and evaluate the parameters which indicate characteristics of MB injection. As a result of these simulation studies, it was indicated that capillary pressure curves calculated based on core flooding tests were different between normal and MB injection and were also related to the differences of injection area between normal and MB injection in spite of same sample (Berea sand) , fluids (brine and CO_2) and condition (pressure, temperature and flow rate).

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