Acoustic characteristics of formation water when injecting scCO2 microbubbles

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The effectiveness of CO2 microbubble method for geological sequestration was investigated. For the comparison of the conventional method and CO2 microbubble method, the CO2 behavior in Berea sandstone saturated by the KCl solution was monitored by measuring ultrasonic compressional velocity (Vp) in both method.

However, in the injection of CO2, there were two factors of the change of Vp. One is CO2 dissolution into pore water and another is replacement of CO2 and pore water. To separate the factor of the change of Vp, Vp of saline water was measured when injecting CO2 microbubbles into saline water. The change of Vp effected by CO2 dissolution was less than 1%. Therefore, in first experiment, the change of Vp in the injection of CO2 was effected by the CO2 replacement of pore water more than the CO2 dissolution. And the change of Vp in Berea sandstone showed the slow CO2 migration in CO2 microbubble method. This is because dissolution of amount of CO2 microbubbles increased.

This result shows microbubble method could increase the reservoir potential for CO2, which also showed by X-ray CT scan results.

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