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Acoustic characteristics of formation water when injecting scCO2 microbubbles

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The effectiveness of CO_2 microbubble method for geological sequestration was investigated. For the comparison of the conventional method and CO_2 microbubble method, the CO_2 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 CO_2, there were two factors of the change of Vp. One is CO_2 dissolution into pore water and another is replacement of CO_2 and pore water. To separate the factor of the change of Vp, Vp of saline water was measured when injecting CO_2 microbubbles into saline water. The change of Vp effected by CO_2 dissolution was less than 1 %. Therefore, in first experiment. the change of Vp in the injection of CO_2 was effected by the CO_2 replacement of pore water more than the CO_2 dissolution. And the change of Vp in Berea sandstone showed the slow CO_2 migration in CO_2 microbubble method. This is because dissolution of amount of CO_2 microbubbles increased.

This result shows microbubble method could increase the reservoir potential for CO_2, which also showed by X-ray CT scan results.

Keywords: microbubble, carbon capture and storage, P-wave velocity