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Experimental study of residual CO_2 saturation in the sandstones with different pore structures

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It is important to monitor the reservoir and injected CO_2 by using seismic wave velocity. Especially, mapping of CO_2 migration is important for risk assessment and prediction of CO_2 behavior in reservoir. It provide the fundamental information of storage capacity and economic activity for CCS project. To evaluate the storage volume of CO_2quantitatively, we have to interpret the seismic wave velocity. In Nagaoka project, we estimated the CO_2 saturation of aquifer by using the result of well logging and laboratory test (Xue et al.,2006). The laboratory measurements of physical properties of rocks will be essential clue to estimate the geophysical data and to construct the realistic reservoir models. Recently, the residual CO_2 saturation attracts attention as a major trapping mechanism of CO_2 after one thousand years. The evaluation the residual CO_2 saturation (Sgr) of sandstones, is considered that will be dominant theme of CCS for future monitoring studies. Sgr is formed after the injection steps when water displaced CO_2 and it depends strongly on pore geometry, porosity and permeability of the reservoirs. In this study, we estimated the residual CO_2saturation by using Vp tomography method. Because, it is the a useful and practical method of estimation for the Sgr from seismic velocity. Thus, we used P-wave velocity (Vp) to monitor the CO_2 distribution and initial and residual CO_2 saturations in two sandstones with Gassmann theory. Our experimental results suggested the heterogenic CO_2 distribution in samples. The heterogenety of Tako sandstone is stronger than Berea sandstone. This result showed that pore structure is strongly affectted on the CO_2 distribution. Sgr of Tako sandstone, which is calculated from Vp, is larger than that of Berea sandstone. These results also can be used to examine the residual trapping mechanism in saline aquifer

storage of CO_2.