Modifying the Wettability of Sandstones Using Nonfluorinated Silylation: To Minimize the Water Blockage Effect

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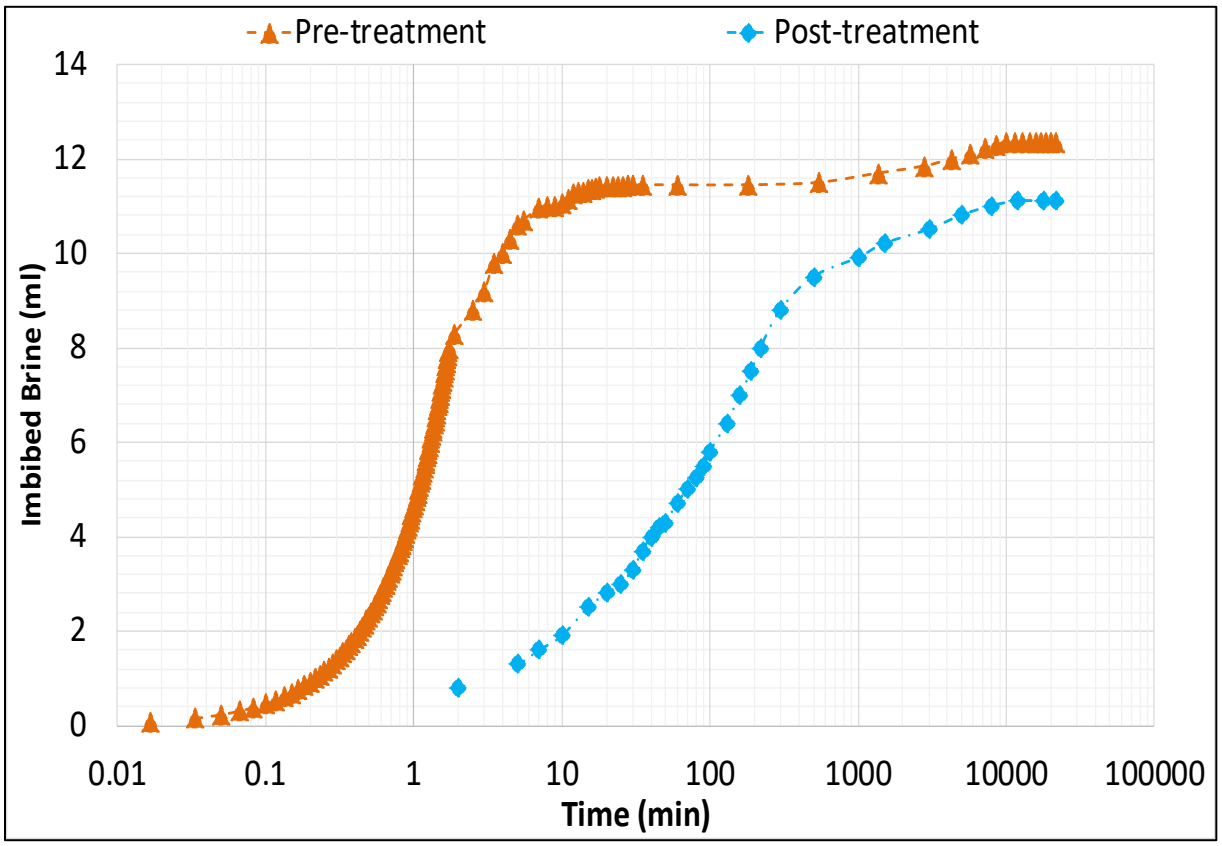

Figure S1. Spontaneous brine imbibition vs time in GB.1, pre- and post-treatment.

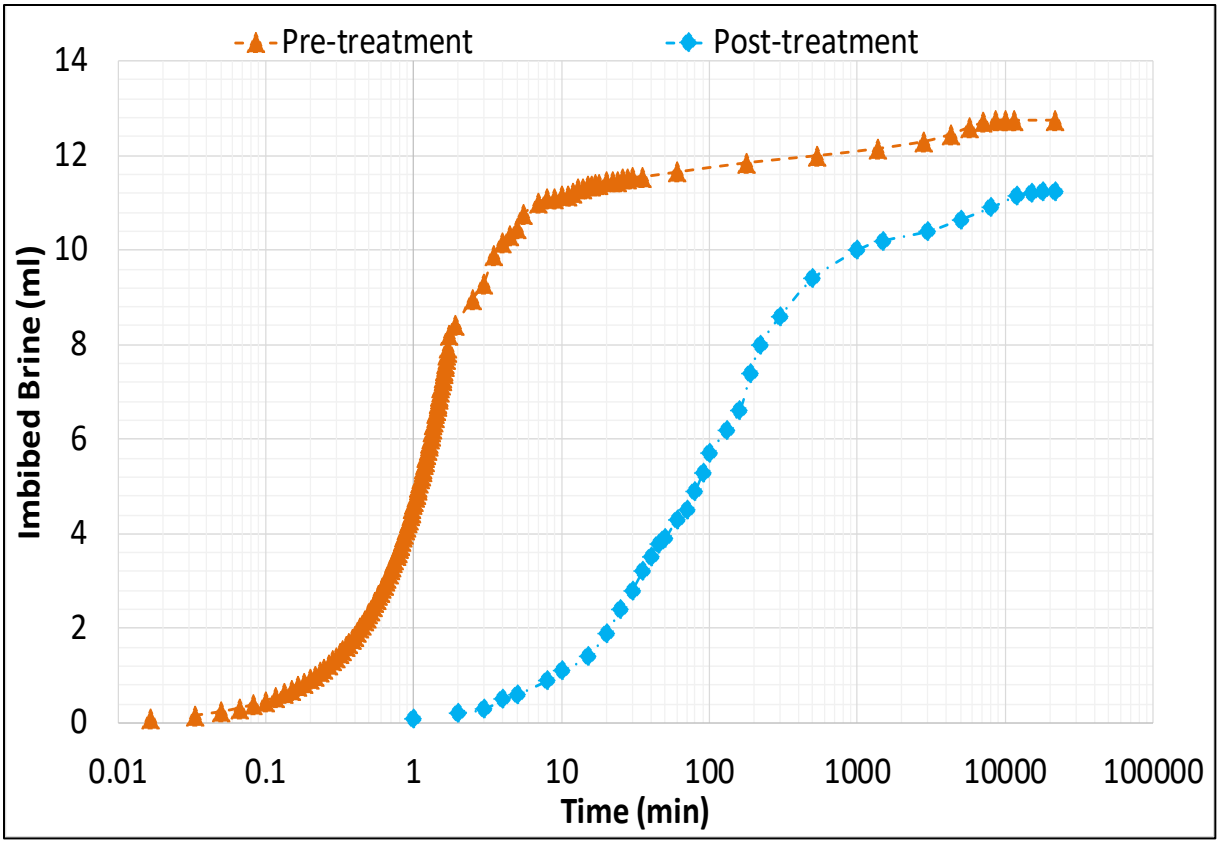

Figure S2. Spontaneous brine imbibition vs time in GB.3, pre- and post-treatment.

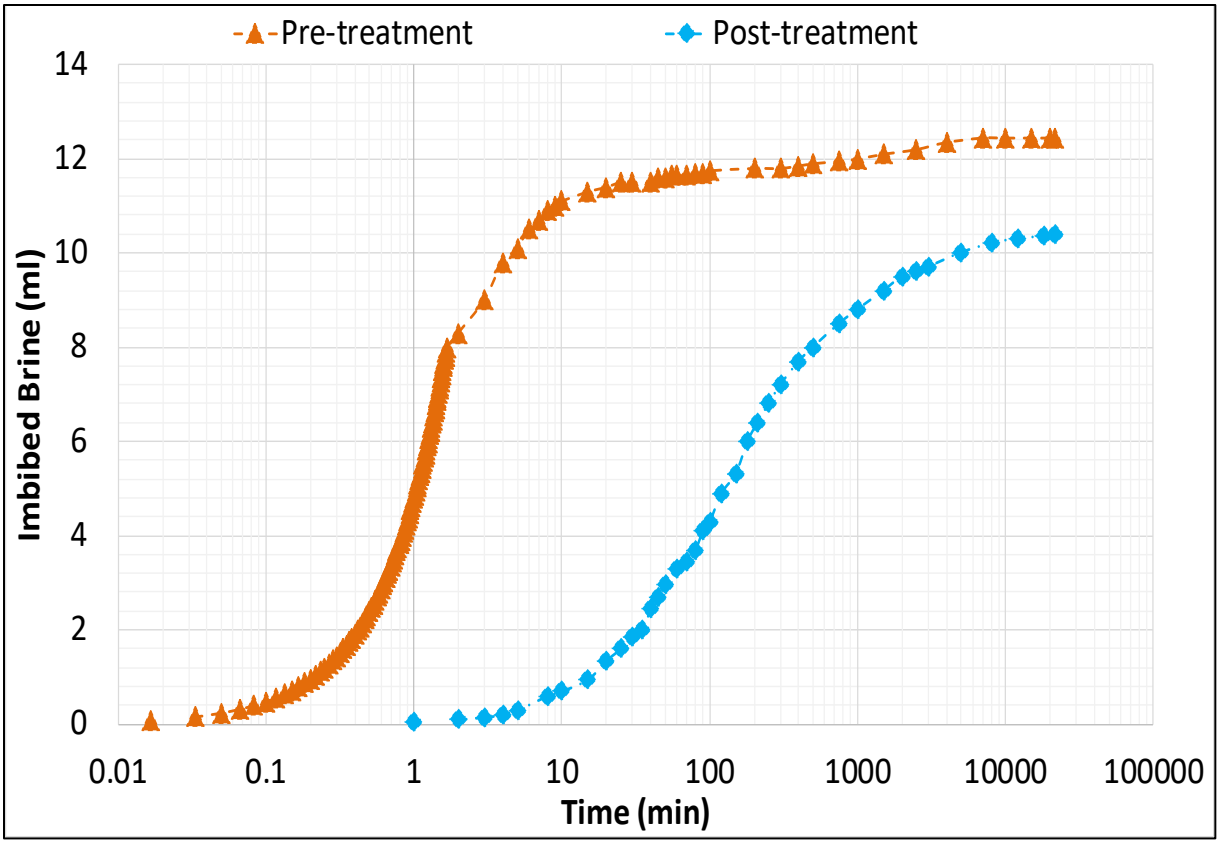

Figure S3. Spontaneous brine imbibition vs time in GB.4, pre- and post-treatment.

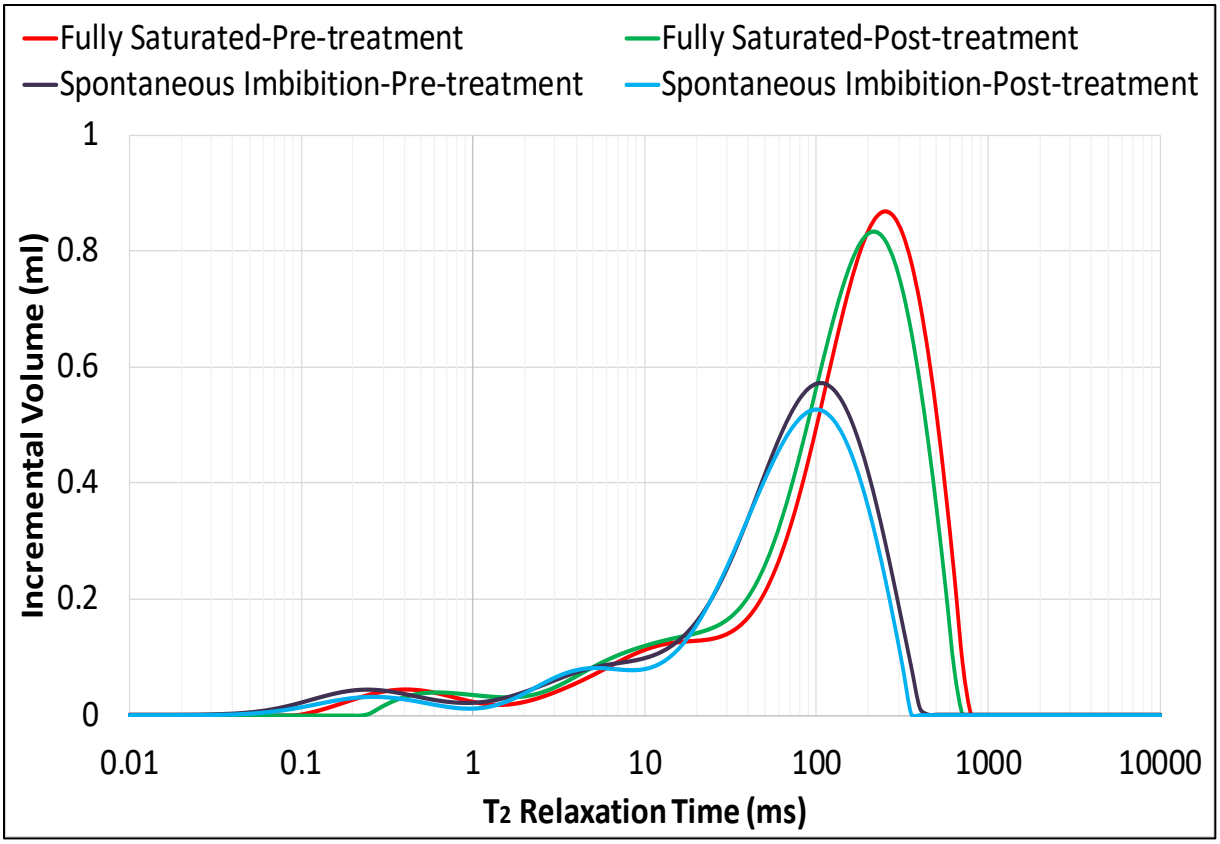

Figure S4. Incremental brine volume for pre- and post-treated GB.1.

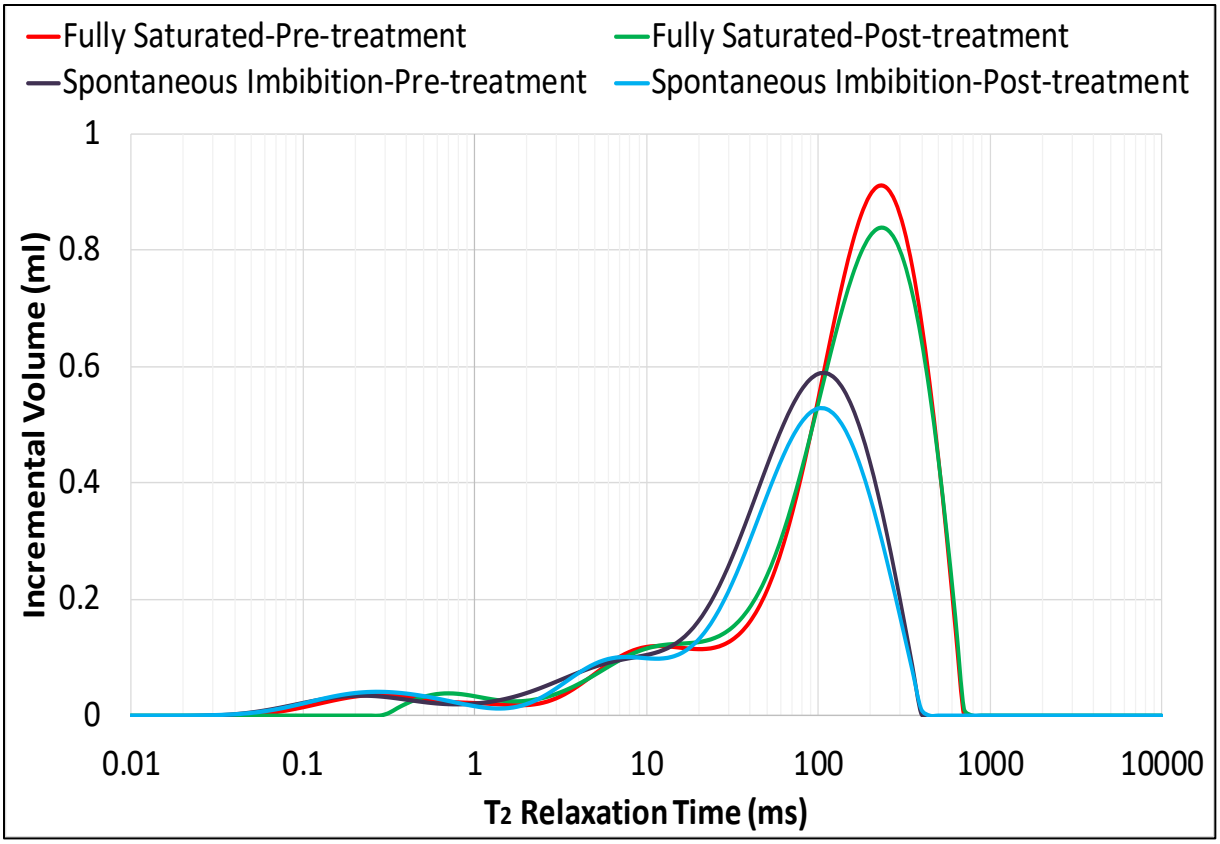

Figure S5. Incremental brine volume for pre- and post-treated GB.3.

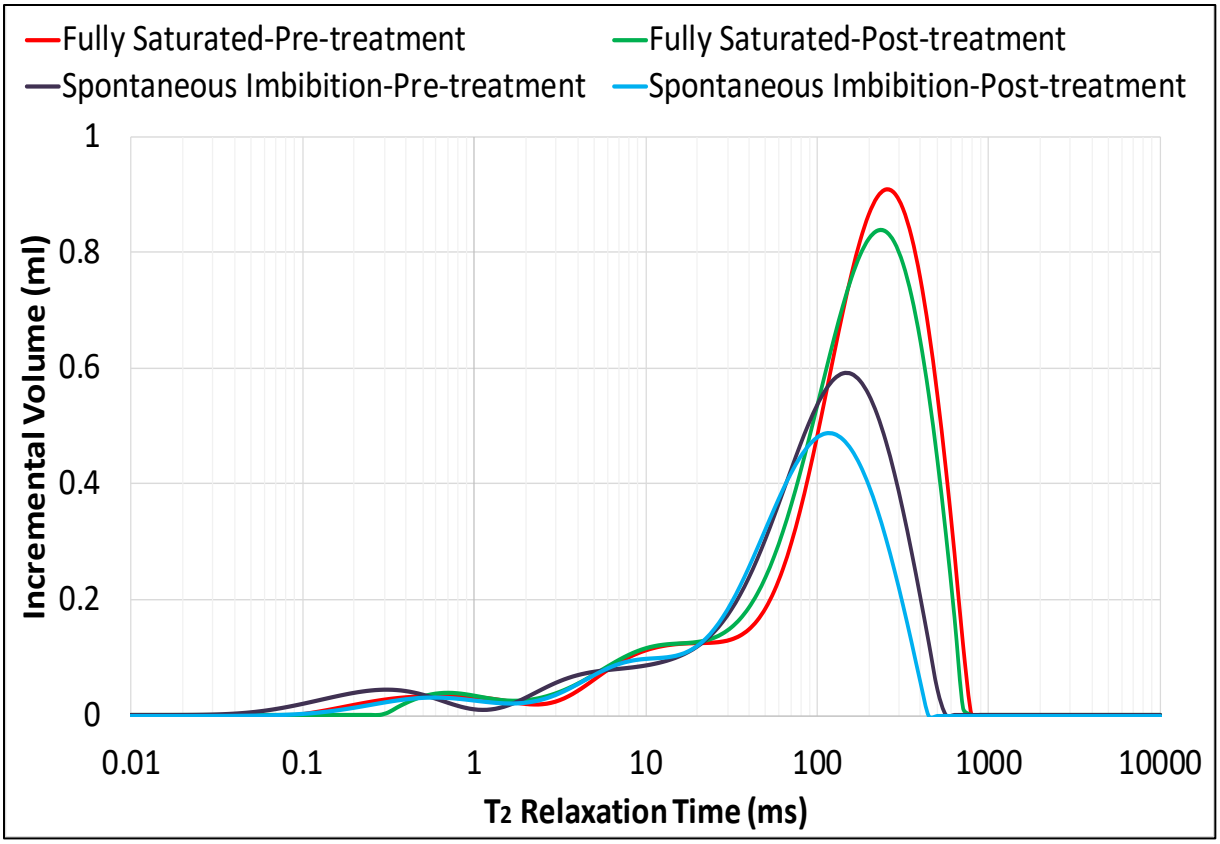

Figure S6. Incremental brine volume for pre- and post-treated GB.4.

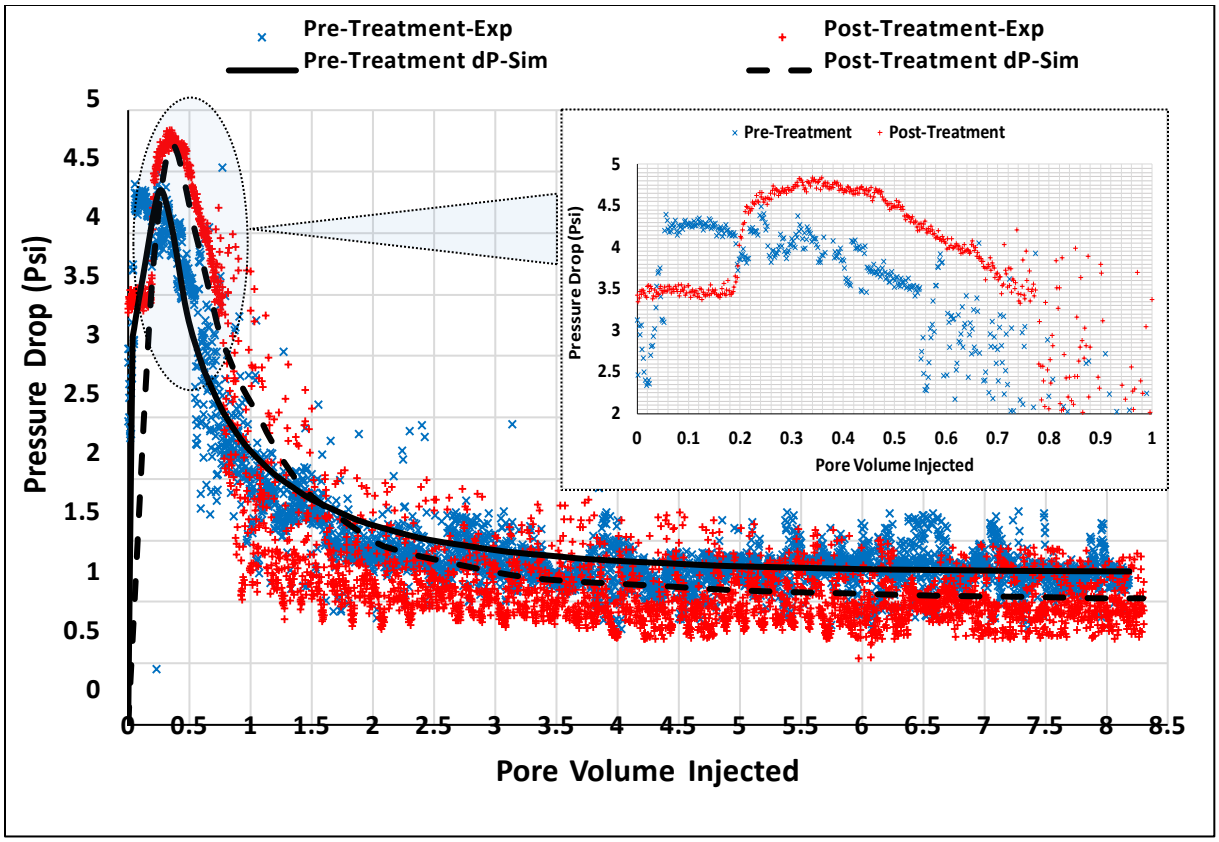

Figure S7. Experimental differential pressure (denoted by Exp) vs. pore volumes of CO_2 injected through the GB.1 sandstone sample pre- (blue cross symbol) and post-silylation (red plus symbol) with 2wt% of CPTS (inset compares the breakthrough points) Solid and dashed black lines represent the numerical simulation history matched differential pressure for pre- and post-silylation respectively (denoted by Sim).

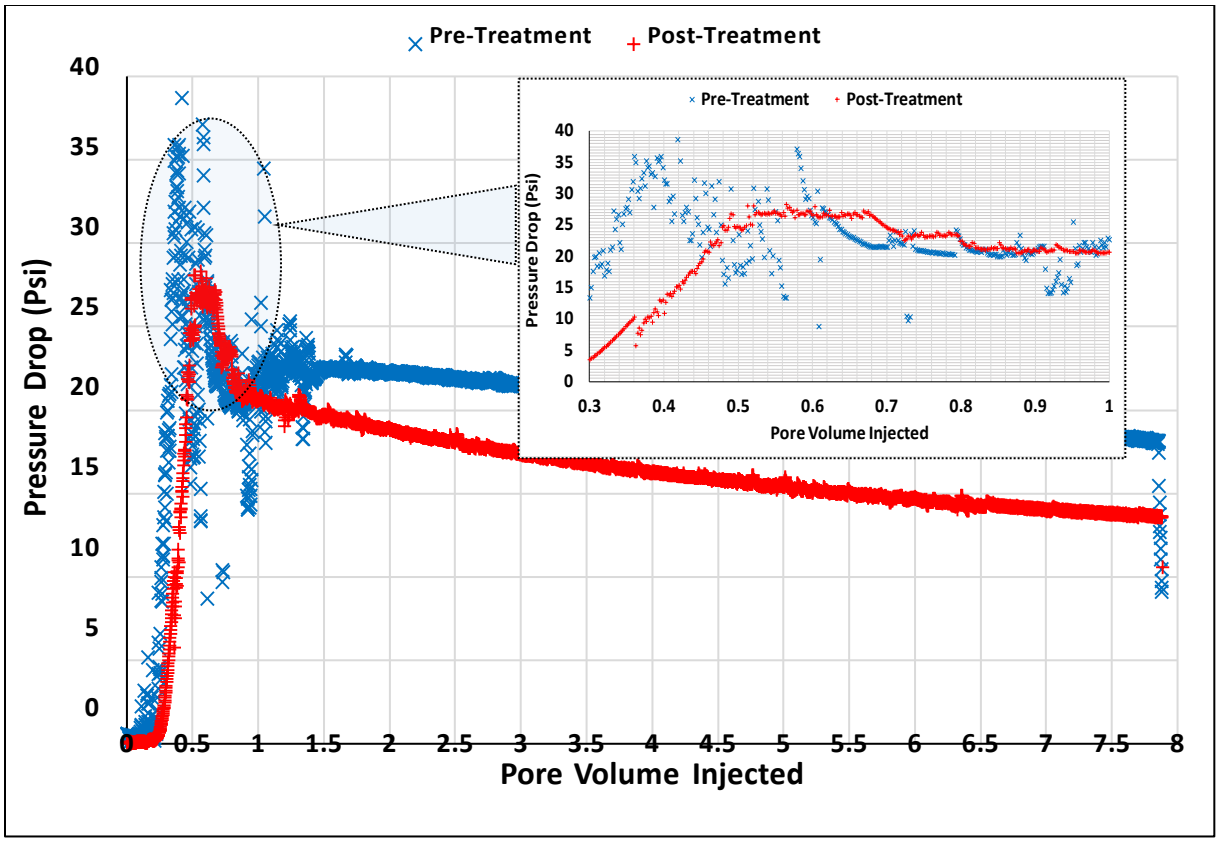

Figure S8. Differential pressure vs. pore volumes of brine injected through the GB.1 sandstone sample pre- (blue cross symbol) and post-silylation (red plus symbol) with 2wt% of CPTS (inset compares the breakthrough points).

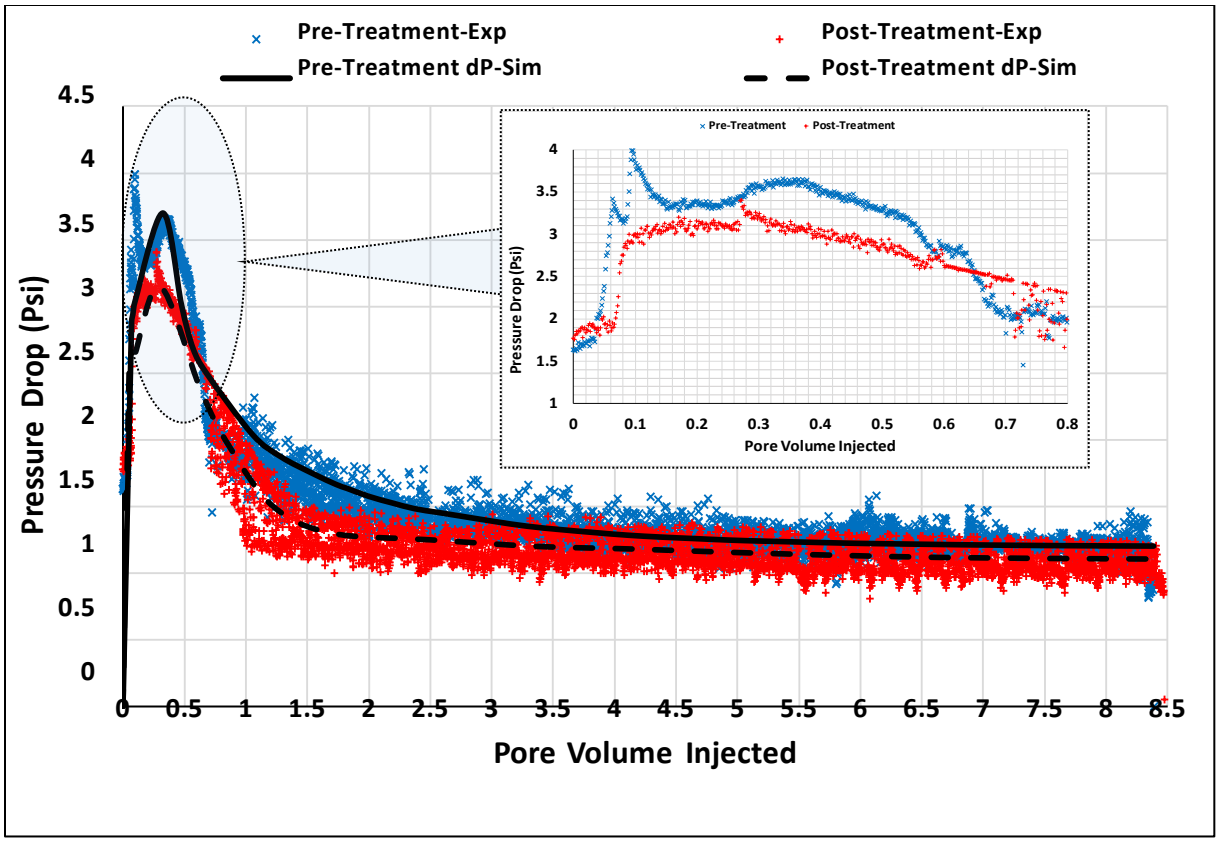

Figure S9. Experimental differential pressure (denoted by Exp) vs. pore volumes of CO_2 injected through the GB.3 sandstone sample pre- (blue cross symbol) and post-silylation (red plus symbol) with 2wt% of CPTS (inset compares the breakthrough points). Solid and dashed black lines represent the numerical simulation history matched differential pressure for pre- and post-silylation respectively (denoted by Sim).

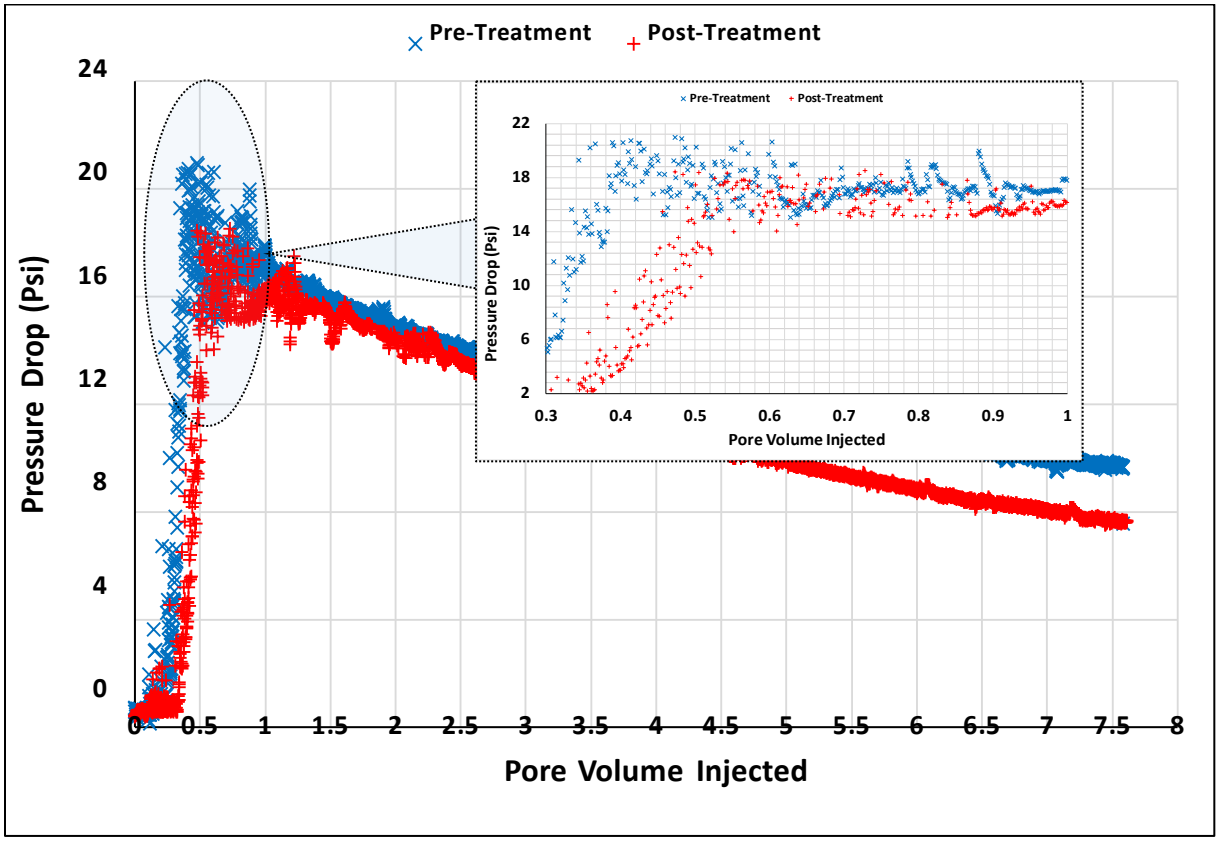

Figure S10. Differential pressure vs. pore volumes of brine injected through the GB.3 sandstone sample pre- (blue cross symbol) and post-silylation (red plus symbol) with 2wt% of CPTS (inset compares the breakthrough points).

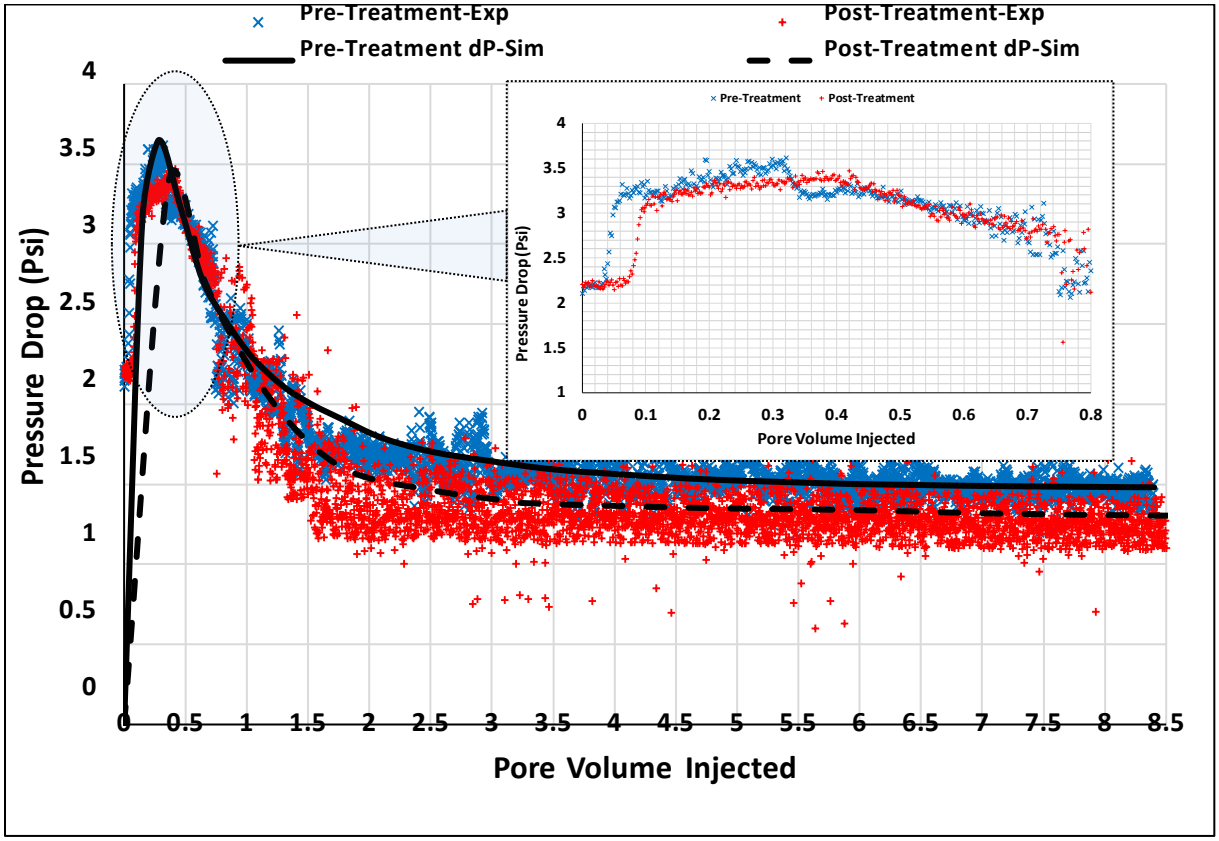

Figure S11. Experimental differential pressure (denoted by Exp) vs. pore volumes of CO_2 injected through the GB.4 sandstone sample pre- (blue cross symbol) and post-silylation (red plus symbol) with 2wt% of CPTS (inset compares the breakthrough points). Solid and dashed black lines represent the numerical simulation history matched differential pressure for pre- and post-silylation respectively (denoted by Sim).

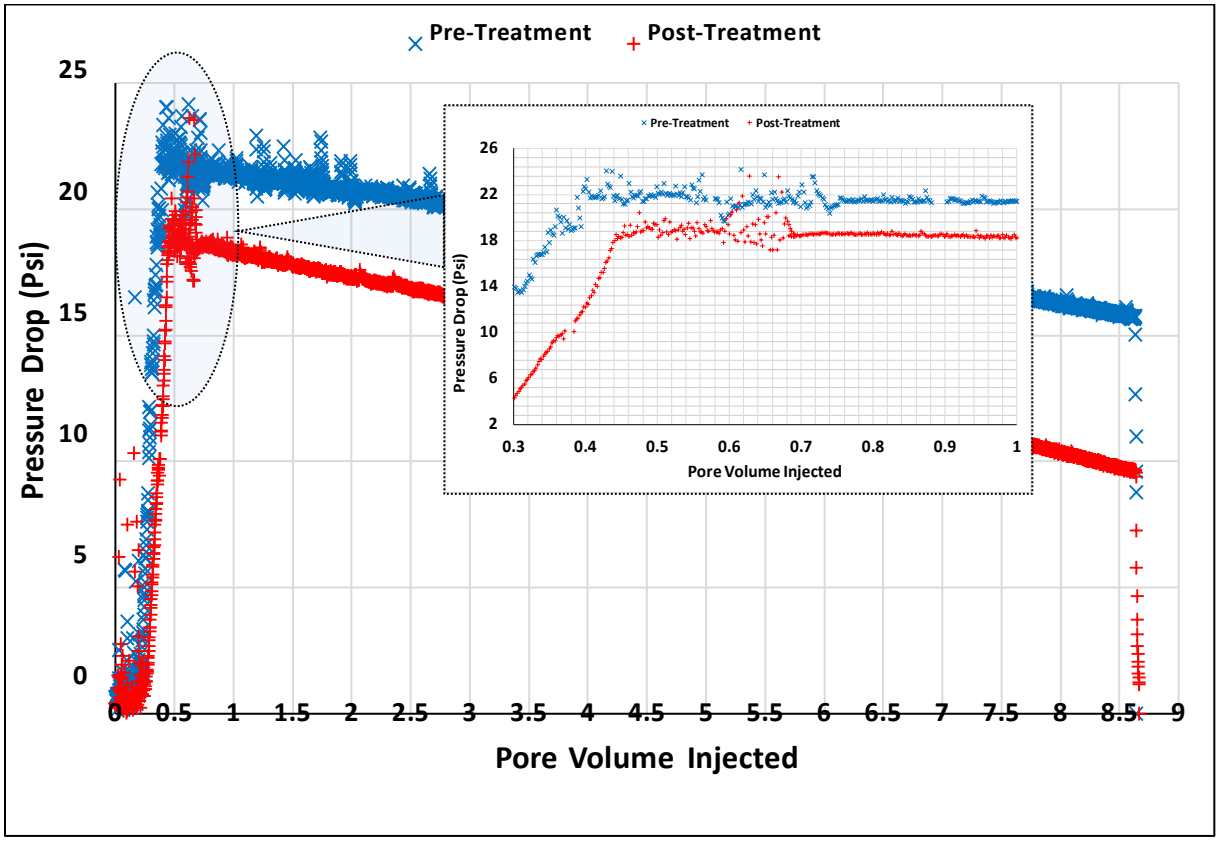

Figure S12. Differential pressure vs. pore volumes of brine injected through the GB.4 sandstone sample pre- (blue cross symbol) and post-silylation (red plus symbol) with 2wt% of CPTS (inset compares the breakthrough points).

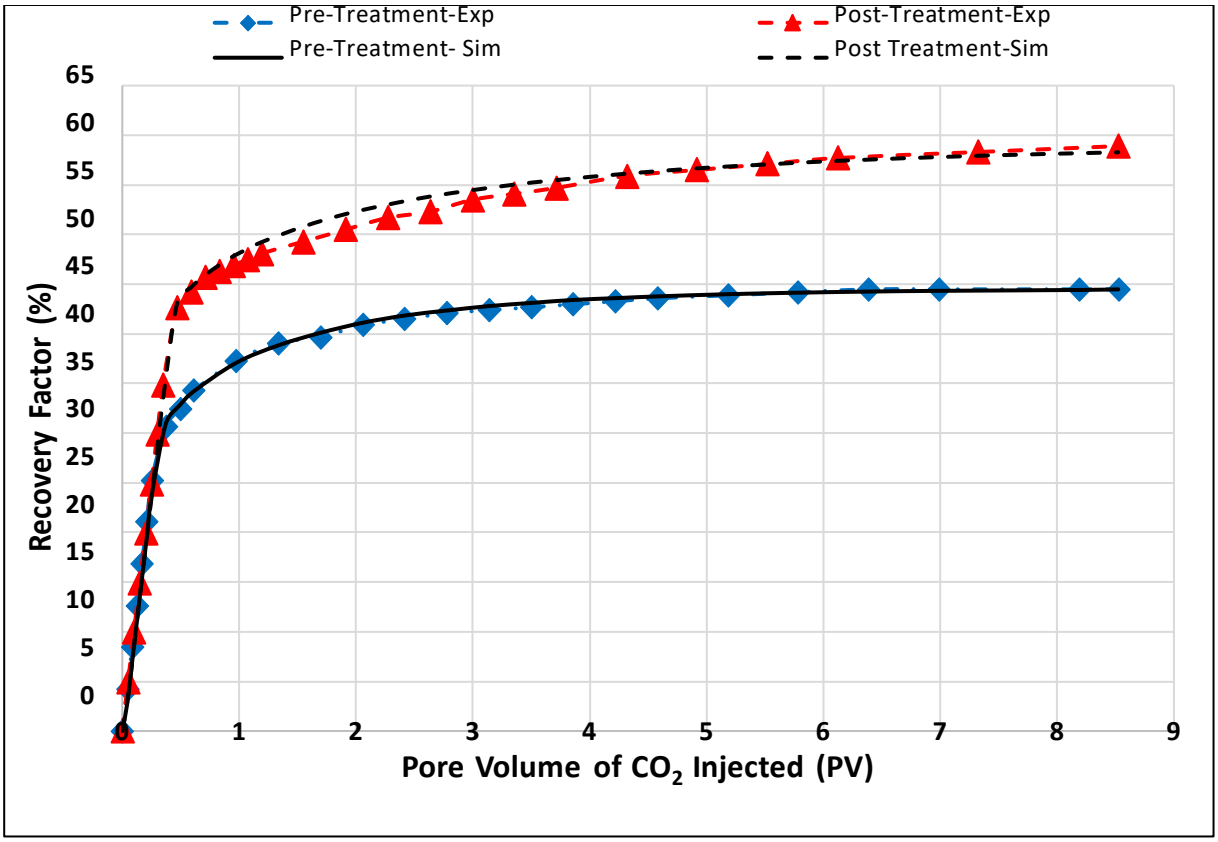

Figure S13. Experimental brine recovery factor during $scCO_2$ injection for pre-treatment (blue diamond symbol) and post-treatment (red triangle symbol) for GB.1 (denoted by Exp). Solid and dashed black lines represent the numerical simulated brine recovery for pre- and post-treatment respectively (denoted by Sim).

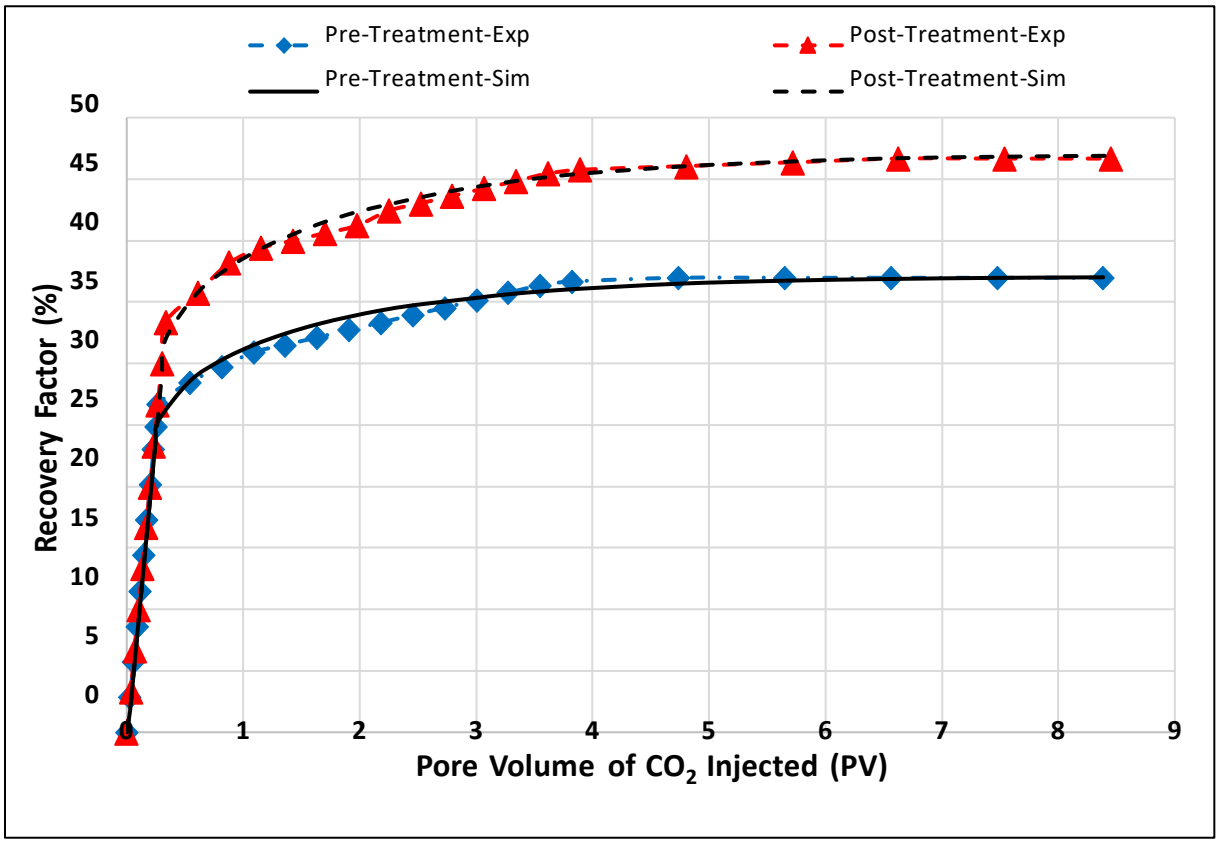

Figure S14. Experimental brine recovery factor during $scCO_2$ injection for pre-treatment (blue diamond symbol) and post-treatment (red triangle symbol) for GB.3 (denoted by Exp). Solid and dashed black lines represent the numerical simulated brine recovery for pre- and post-treatment respectively (denoted by Sim).

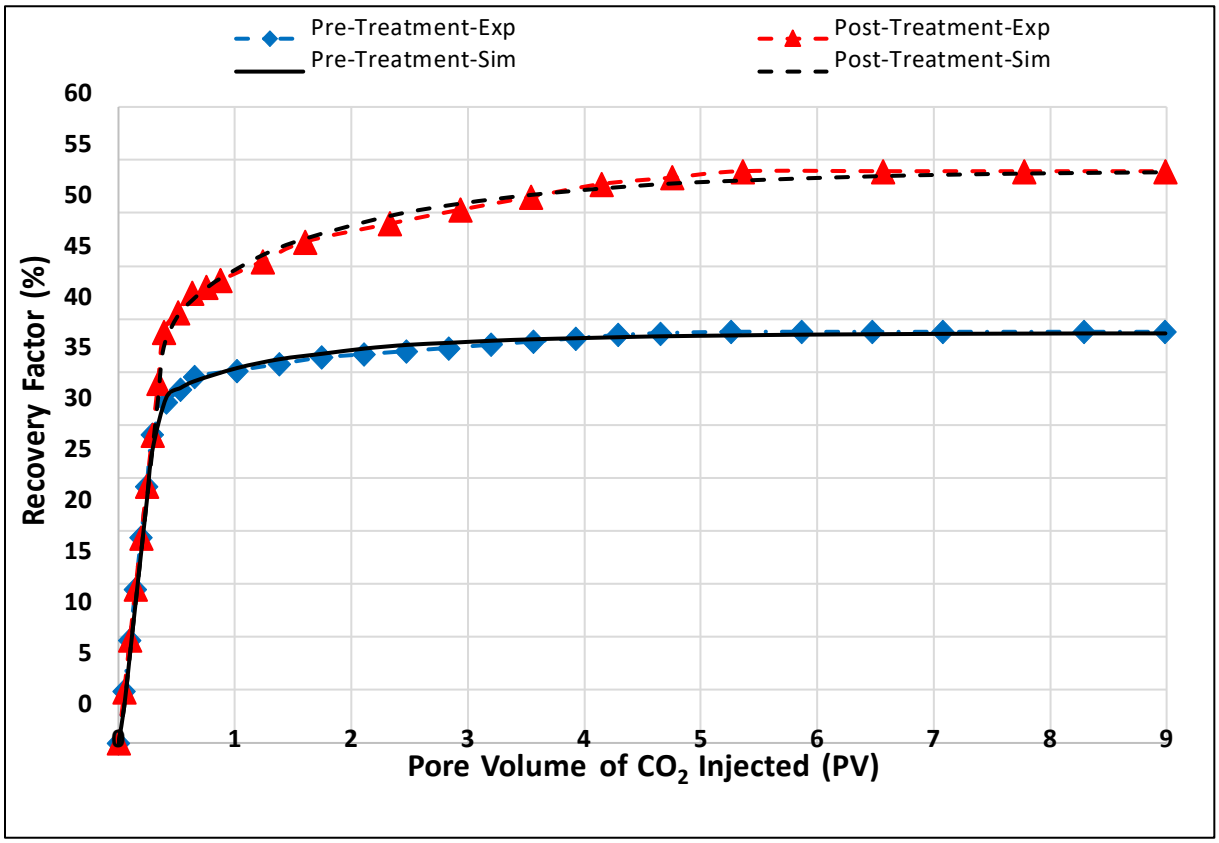

Figure S15. Experimental brine recovery factor during $scCO_2$ injection for pre-treatment (blue diamond symbol) and post-treatment (red triangle symbol) for GB.4 (denoted by Exp). Solid and dashed black lines represent the numerical simulated brine recovery for pre- and post-treatment respectively (denoted by Sim).

Table S1. Best-fit relative permeability parameters for core–floods fit to the Sigmund and McCaffery model.

Sample ID	N_w	N_g	A	B
GB.1 Pre-treatment	7.6632	3.08277	0.23413	0.00435
GB.1 Post-treatment	6.0258	4.35972	0.189827	0.029713
GB.2 Pre-treatment	3.60224	3.33202	0.122618	0.010885
GB.2 Post-treatment	4.19813	3.38595	0.11366	0.028578
GB.3 Pre-treatment	4.00664	2.98626	0.149121	0.007186
GB.3 Post-treatment	3.71125	2.85487	0.176508	0.020602
GB.4 Pre-treatment	3.34198	4.82534	0.162858	0.001
GB.4 Post-treatment	3.8303	2.98214	0.210274	0.007608

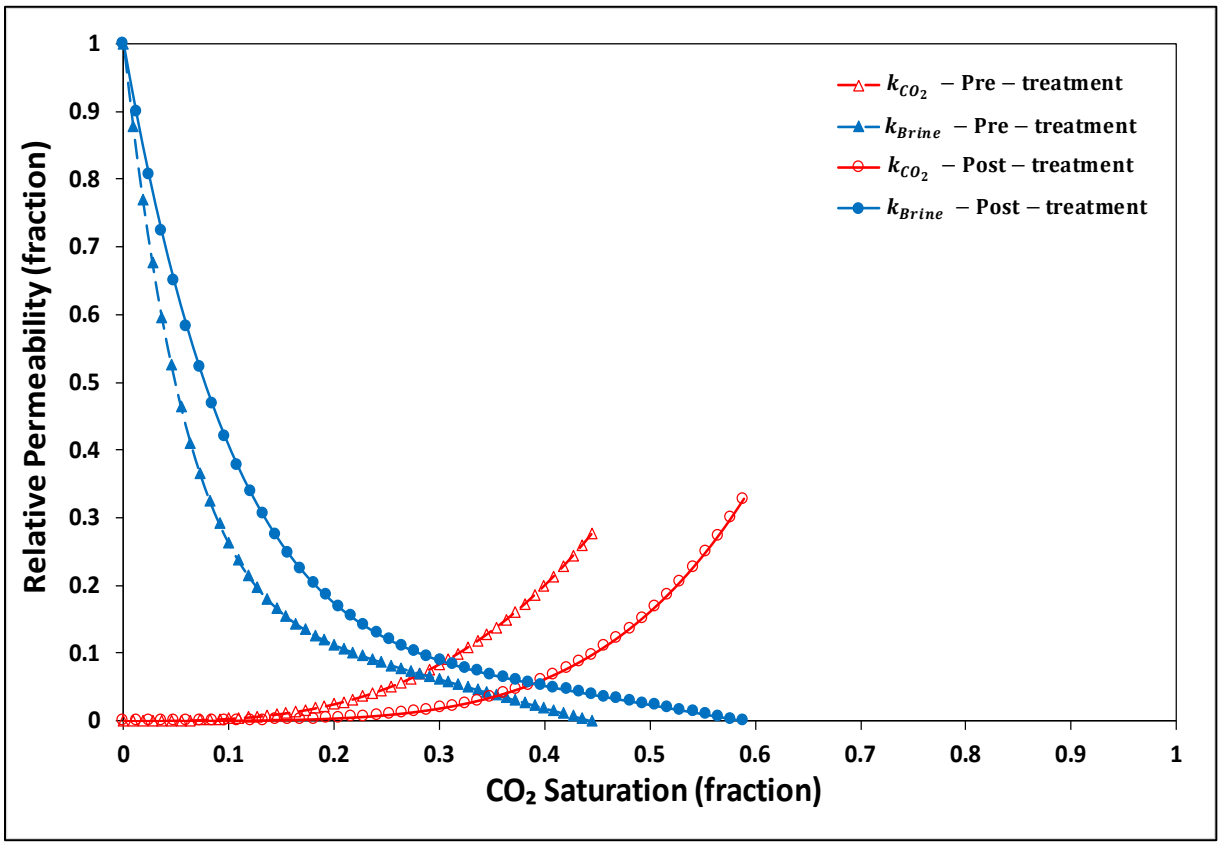

Figure S16. Relative permeability curves for the primary drainage conducted on pre-treated (triangle symbol) and post-treated (circle symbol) for GB.1 sample.

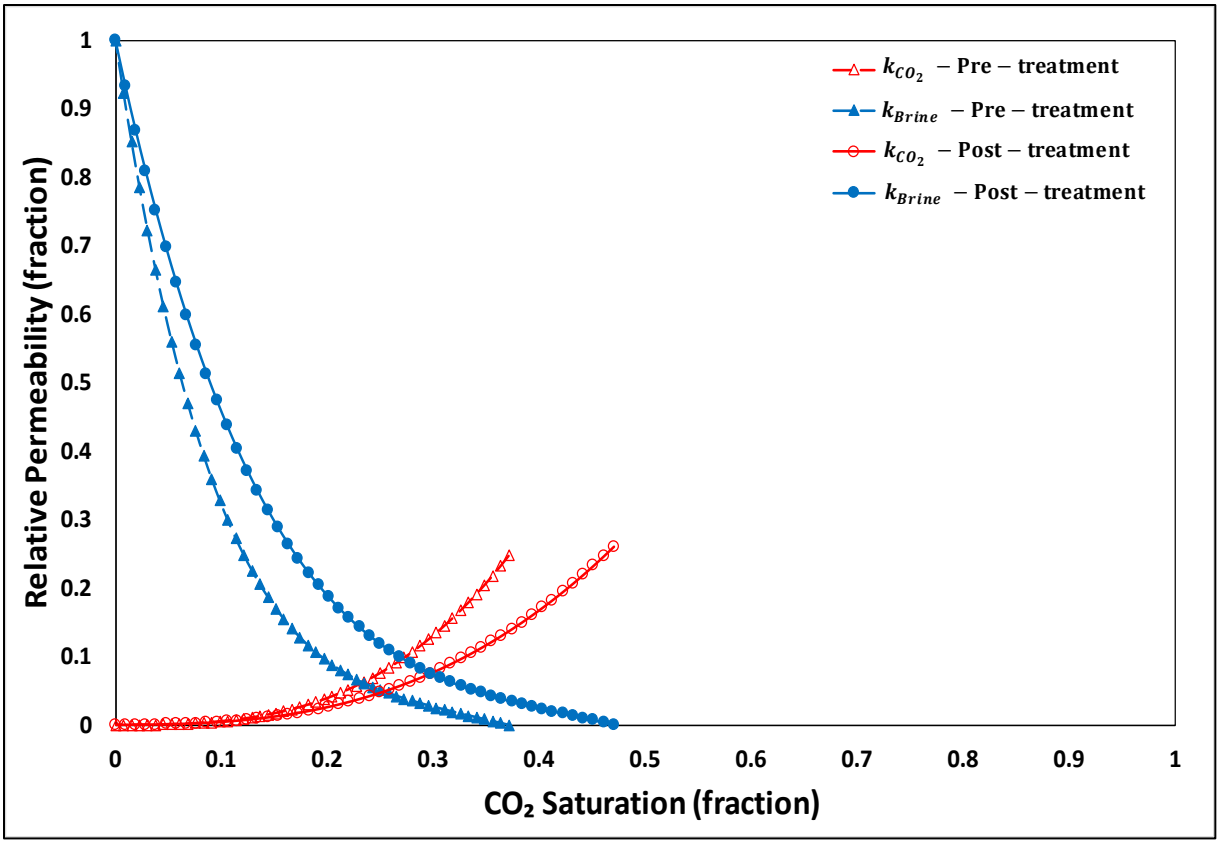

Figure S17. Relative permeability curves for the primary drainage conducted on pre-treated (triangle symbol) and post-treated (circle symbol) for GB.3 sample.

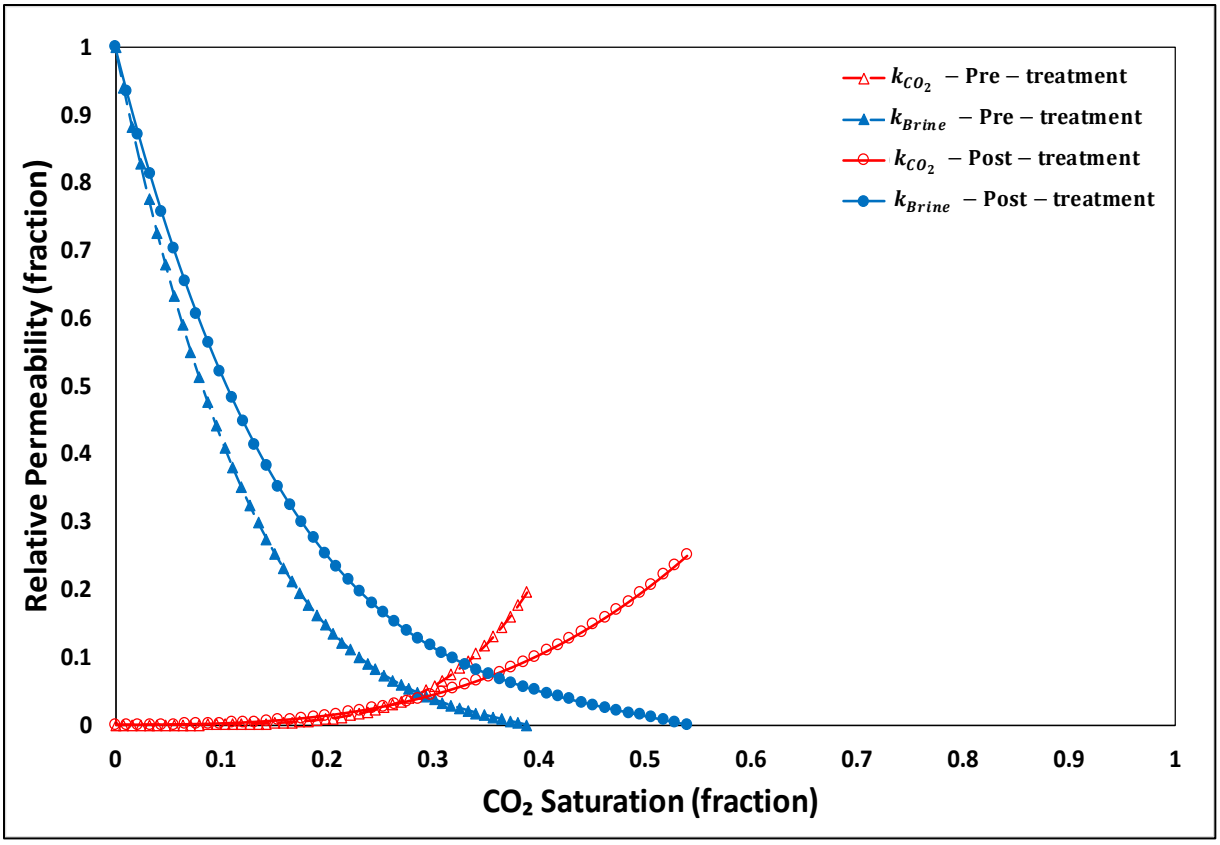

Figure S18. Relative permeability curves for the primary drainage conducted on pre-treated (triangle symbol) and post-treated (circle symbol) for GB.4 sample.