

Supporting information A. Data selection

Table A 1. Data from Van Loon et al. (2007). Chloride accessible porosities were obtained by four different techniques used on the same samples: in-diffusion, through-diffusion, ³⁶Cl mass balance and stable Cl mass balance calculations. When the different methods resulted in contrasted accessible porosity values, through diffusion and ³⁶Cl mass balance were considered as giving most reliable results because of sample boundary effects on the porosity determined by out-diffusion experiments (Van Loon et al., 2007).

Bentonite dry bulk density	Re-calculated montmorillonite dry bulk density	NaCl concentration	Measured porosity normalized to montmorillonite dry bulk density			
			Through diffusion	Out diffusion	³⁶ Cl mass balance	Stable Cl mass balance
kg/dm ³	kg/dm ³	mol/L				
1.321	1.094	0.010	0.020	0.022	0.023	0.040
1.321	1.094	0.050	0.062	n.d.	0.058	0.053
1.321	1.094	0.100	0.027*	0.117	0.105	0.089
1.321	1.094	0.400	0.198	n.d.	0.233	0.163
1.321	1.094	1.000	0.131	0.350*	0.268	0.257
1.625	1.400	0.010	0.005	0.007	0.007	0.011
1.625	1.400	0.050	0.019	n.d.	0.022	0.019
1.625	1.400	0.100	0.025	0.036	0.036	0.035
1.625	1.400	0.400	0.073	n.d.	0.075	0.073
1.625	1.400	1.000	0.076	0.091	0.109	0.133
1.929	1.730	0.010	0.001	0.025*	0.003	0.011*
1.929	1.730	0.050	0.006	n.d.	0.008	0.009
1.929	1.730	0.100	0.009	0.011	0.010	0.019
1.929	1.730	0.400	0.029	n.d.	0.020	0.021
1.929	1.730	1.000	0.030	0.044	0.044	0.056

n.d. Not determined

* Discarded data because of large discrepancy with other measurements obtained by other techniques

Table A 2. Data from Molera et al. (2003). Chloride and iodide accessible porosities were obtained by through-diffusion experiments. Porosity derived from “fast process” diffusion (Table 2 of the reference) was considered for porosity values estimation because they were consistent with values obtained from Van Loon et al. (2007) and Muurinen et al. (2004; 2007).

Bentonite dry bulk density	Re-calculated montmorillonite dry bulk density	NaI concentration	Measured porosity normalized to montmorillonite dry bulk density
kg/dm³	kg/dm³	mol/L	(-)
0.400	0.312	0.01	0.260
0.400	0.312	0.1	0.519
0.400	0.312	0.1	0.519
0.800	0.648	0.01	0.151
0.800	0.648	0.1	0.411
0.800	0.648	0.1	0.421
1.200	1.013	0.01	0.101
1.200	1.013	0.1	0.180
1.200	1.013	0.1	0.327
1.600	1.411	0.1	0.176
1.800	1.622	0.01	0.024
1.800	1.622	0.1	0.042
1.800	1.622	0.1	0.048
Bentonite dry bulk density	Re-calculated montmorillonite dry bulk density	NaCl concentration	Measured porosity normalized to montmorillonite dry bulk density
0.400	0.312	0.01	0.291
0.400	0.312	0.1	0.416
0.400	0.312	0.1	0.519
0.800	0.648	0.01	0.130
0.800	0.648	0.1	0.421
0.800	0.648	0.1	0.389
1.200	1.013	0.01	0.113
1.200	1.013	0.1	0.180
1.200	1.013	0.1	0.203
1.600	1.411	0.1	0.176
1.800	1.622	0.01	0.048
1.800	1.622	0.1	0.048
1.800	1.622	0.1	0.060

Table A 3. Data from Muurinen et al. (1989). Chloride accessible porosities were obtained by through-diffusion experiments. Porosities were derived from $\varepsilon = D_e/D_a$ where D_a is the apparent diffusion coefficient and D_e is the effective diffusion coefficient. D_a values (and hence ε) were estimated using two methods: from the tracer concentration profile in the bentonite plug (CP) or from the breakthrough curve (BC). Data obtained with CP method were selected they better agree with other data obtained in similar conditions by other authors, especially at 0.01 mol/L NaCl concentration.

Bentonite dry bulk density	Re-calculated montmorillonite dry bulk density	NaI concentration	Measured Porosity normalized to montmorillonite dry bulk density	
			BC	CP
kg/dm ³	kg/dm ³	mol/L		
1.200	1.013	0.01	0.068*	0.012
1.800	1.622	0.01	0.008*	0.024
1.200	1.013	0.1	0.169*	0.113
1.800	1.622	0.1	0.011*	0.024
1.200	1.013	1	0.428*	0.270
1.800	1.622	1	0.060*	0.096

* Discarded data

Table A 4. Data from Muurinen et al. (2004). Chloride accessible porosities were obtained by the dispersion method. Two types of samples were considered. Samples A were saturated directly with NaCl solutions while samples B were saturated first with deionized water and then equilibrated with the NaCl solutions. One porosity value was considered as being not reliable (See Figure A. 1). This data was discarded.

Bentonite dry bulk density	Re-calculated montmorillonite dry bulk density	NaCl concentration	Measured porosity normalized to montmorillonite dry bulk density
kg/dm³	kg/dm³	mol/L	(-)
Samples A			
0.754	0.608	0.1	0.511
0.855	0.697	0.1	0.294
1.273	1.083	0.1	0.136
1.636	1.448	0.1	0.118
1.764	1.584	0.1	0.212
0.903	0.740	0.3	0.468
1.310	1.119	0.3	0.222
1.645	1.457	0.3	0.146
1.771	1.591	0.3	0.205
1.289	1.099	1	0.307
1.598	1.408	1	0.192
1.742	1.560	1	0.135
1.363	1.171	3	0.378
1.624	1.435	3	0.234
1.756	1.575	3	0.181
Samples B			
0.750	0.605	0.1	0.858*
0.875	0.715	0.1	0.457
1.225	1.037	0.1	0.159
1.516	1.324	0.1	0.064
1.543	1.352	0.1	0.073
0.954	0.785	0.3	0.572
1.058	0.880	0.3	0.380
1.206	1.019	0.3	0.333
1.559	1.368	0.3	0.147
1.662	1.475	0.3	0.071

* Discarded data

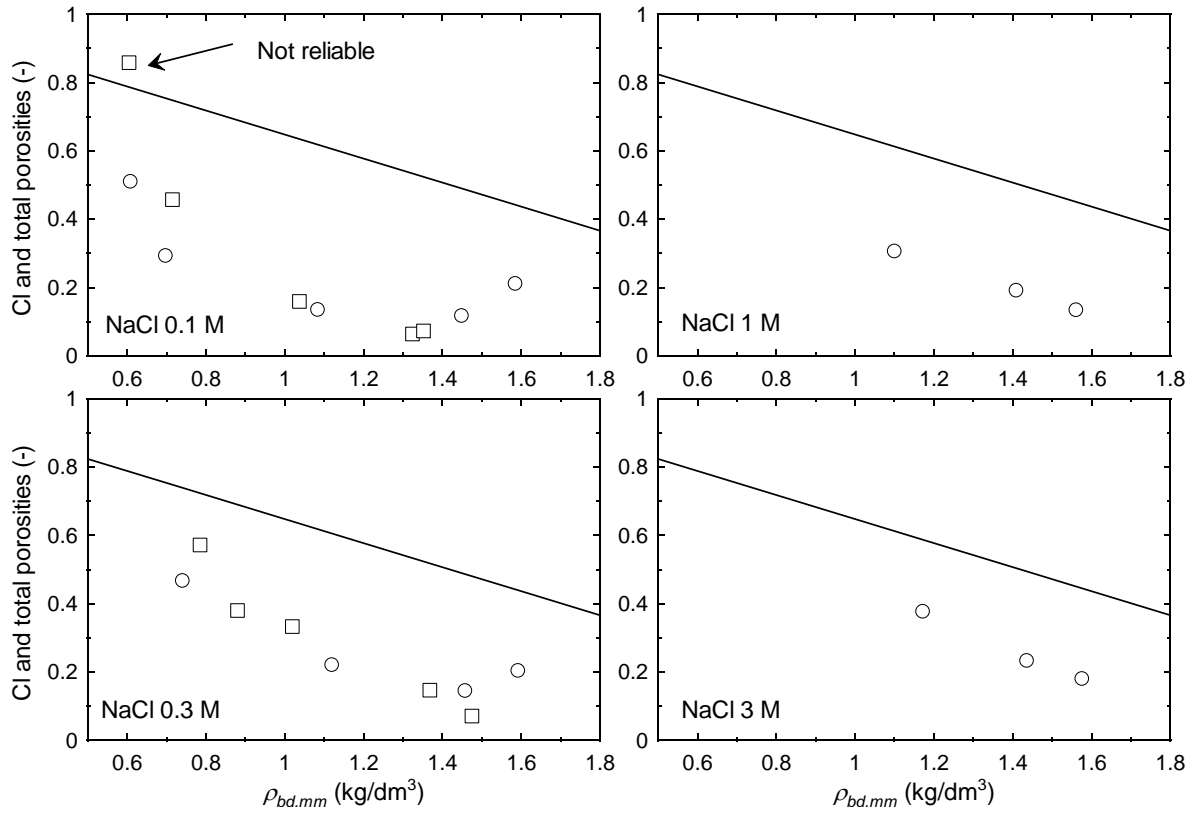


Figure A. 1. Comparison between experimental CI accessible porosities and total porosities in data from Muurinen et al. (2004). Solid lines = total porosity. Circles = Samples A. Square = Samples B.

Table A 5. Data from Muurinen et al. (2007). Chloride accessible porosities were obtained by the dispersion method. Only three series (A, B, C) of reference data are considered since last two series of data are identical to those published in Muurinen et al. (2004). Series A, B and C differs from each other by the time allowed to the system for equilibration with deionized water, first, and then with NaCl solutions. Series D and E in this paper correspond to series A and B from previous table and have not been duplicated in the present work.

Bentonite dry bulk density	Re-calculated montmorillonite dry bulk density	NaCl concentration	Measured porosity normalized to montmorillonite dry bulk density
kg/dm³	kg/dm³	mol/L	(-)
Samples A			
0.625	0.498	0.1	0.305
0.812	0.659	0.1	0.223
1.200	1.013	0.1	0.129
Samples B			
0.670	0.536	0.1	0.284
0.937	0.770	0.1	0.168
1.389	1.197	0.1	0.087
Samples C			
0.622	0.495	0.1	0.396
0.731	0.588	0.1	0.238
1.113	0.931	0.1	0.114
1.382	1.190	0.1	0.081
1.517	1.325	0.1	0.064