Drink. Water Eng. Sci. Discuss., 8, C18–C21, 2015
www.drink-water-eng-sci-discuss.net/8/C18/2015/

Open Access
Drinking Water
Engineering and Science
Discussions

DWESD
8, C18–C21, 2015

Interactive Comment

Interactive comment on "Natural manganese deposits as catalyst for decomposing hydrogen peroxide" *by* A. H. Knol et al.

A. H. Knol et al.

t.knol@dunea.nl

Received and published: 27 March 2015

Dear Dr. K. Chon,

The specific surface area of the catalytic materials is analyzed. The analyses support the decomposing results. Thanks again for your valuable comments! Based on the analyses, we additionally propose the following adjustments in the manuscript.

We propose to extent Table 1 with specific surface area, see Fig 1, C4.

Instead of the first proposal: P7, line 11: We propose to add: "Possibly a part of the manganese oxides in MCFgw are enclosed and did not contribute to the decomposition, or the surface area of MCFsw is larger (not determined)". We propose: P7, line 9: "Despite the manganese content of MCFgw of 14 gkg-1, about 100 times higher

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

compared to MCFsw, and twice as large specific surface area, 4.0 m2g-1 compared to 1.9/2.1 m2g-1, the difference in the decomposing time between MCFgw and MCFsw was no more than 30%. Possibly a part of the manganese oxides in MCFgw were enclosed and did not contribute to the decomposition."

Instead of the first proposal P8, line 2: to add: "The presence of ramsdellite, in combination of the high manganese content and small grain size, probably contributed to the high conversion rate. Páez e.a., (2011) reported high conversion rate constants with synthesized nano-needle particals ramsdellite (ø = 10 nm, L = 180 nm). In batch operation a conversion rate constant was measured of 0.015 s-1 after addition of only 0.374 gL-1 particles. The conversion rate constant of 0.015 s-1 of MCFsw is in line with the reported conversion rate constant of 0.007 s-1 during column experiments with sandy aquifer material with different metal deposits (Miller e.a., 1995). Manganese appeared to have the biggest contribution to the decomposition: by lowering the manganese content of 250 mg/kg to 60 mg/kg by dissolving manganese in acid, the conversion rate constant decreased with a factor 10". We propose: P8, line 2: to add: "The high specific surface area of 64 m2g-1 , the high manganese content in the form of (partly) ramsdellite and small grain size, all three factors contributed to the high conversion rate. Páez et.al., (2011) also reported high conversion rate constants with synthesized small nano-needle particals ramsdellite (ø = 10 nm, L = 180 nm). In batch operation a conversion rate constant was measured of 0.015 s-1 after addition of only 0.374 gL-1 particles. The conversion rate constant of 0.015 s-1 of MCFsw is in line with the reported conversion rate constant of 0.007 s-1 during column experiments with sandy aquifer material with different metal deposits, from which manganese appeared to have the biggest contribution to the decomposition (Miller e.a., 1995). Not only the manganese content of 0.06 gkg-1 of the sandy aquifer material was comparable with MCFsw (0.15/0.09 gkg-1), but also the specific surface area of 1.75 gm-2 (MCFsw 1.9/2.1 gm-2)."

On behalf of the co-authors, Antonie Knol

DWESD
8, C18–C21, 2015

Parameter	*Unit*	*Course gravel MCFgw*	*Coating MC*	*Anthracite/sand, MCFsw*
10% Grain	mm	1.01	0.25	2.06/0.97
Uniformity 60%/10%	-	2.26	2.02	1.18/1.13
Manganese content	gkg^{-1}	14.0	100.0	0.15/0.09
Specific surface area*	m^2g^{-1}	4.0	64	1.9/2.1

** BET surface area by N2 adsorption*

Fig. 1.

DWESD
8, C18–C21, 2015
Interactive Comment