Pulse current enhanced electrodialytic soil remediation - DTU Orbit (25/12/2018)

Pulse current enhanced electrodialytic soil remediation: Comparison of different pulse frequencies

Energy consumption is an important factor influencing the cost of electrodialytic soil remediation (EDR). It has been indicated that the pulse current (in low frequency range) could decrease the energy consumption during EDR. This work is focused on the comparison of energy saving effect at different pulse frequencies. Based on the restoration of equilibrium, the relaxation process of the soil-water system was investigated by chronopotentiometric analysis to find the optimal relaxation time for energy saving. Results showed that the pulse current decreased the energy consumption with different extent depending on the pulse frequency. The experiment with the frequency of 16 cycles per day showed the best restoration of equilibrium and lowest energy consumption. The energy consumption per removed heavy metals was lower in pulse current experiments than constant current and increased with the pulse frequency. It was found that the transportation of cations through the cation exchange membrane was the rate controlling step both in constant and pulse current experiments, thus responsible for the major energy consumption. Substitution of the cation exchange membrane with filter paper resulted in a dramatic decrease in energy consumption, but this change impeded the acidification process and thus the removal of heavy metals decreased significantly. (C) 2012 Elsevier B.V. All rights reserved.

General information
State: Published
Organisations: Department of Civil Engineering, Section for Construction Materials, Section for Geotechnics and Geology
Contributors: Sun, T. R., Ottosen, L. M., Jensen, P. E.
Pages: 299-306
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Journal of Hazardous Materials
Volume: 237-238
ISSN (Print): 0304-3894
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 6.75 SJR 1.787 SNIP 1.96
Web of Science (2017): Impact factor 6.434
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 6.31 SJR 1.742 SNIP 2.061
Web of Science (2016): Impact factor 6.065
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 5.54 SJR 1.633 SNIP 1.931
Web of Science (2015): Impact factor 4.836
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 5.21 SJR 1.814 SNIP 2.258
Web of Science (2014): Impact factor 4.529
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 5.09 SJR 1.822 SNIP 2.43
Web of Science (2013): Impact factor 4.331
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 4.73 SJR 1.953 SNIP 2.443
Web of Science (2012): Impact factor 3.925
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 4.81 SJR 1.916 SNIP 2.098