Effect of electrode configuration on electrokinetic removal of phenanthrene

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Electrokinetic process is an in-situ soil remediation technology in which contaminants are extracted from low-permeable soils by electroosmotic flow and electromigration under the electric field. Surfactants are often used to improve the solubility of hydrophobic organic contaminants (HOCs). In this study, the removal characteristics of phenanthrene were investigated with electrode configurations in a lab-scale 2-D electrokinetic test cell. Indonesia kaolin was used and a flushing solution contained a nonionic surfactant, Tergitol 15-S-12, and sodium chloride as an electrolyte.

The effect of electrode spacing with same polarity was investigated with 3 different configurations. Each test cell had 1, 2 or 3 pairs of electrodes. A same constant current was supplied to each test cell and the current was divided equally into each pair of electrodes. In the configuration with three pairs of electrodes, which had the closest spacing between same-polarity electrodes, phenanthrene was mainly removed near anode due to the reduced current density, but the ineffective area between the same-polarity electrodes was minimized.