



Research Assignment - 2008

Principal Investigator Akram Alshawabkeh

Title Professor

College/Department Civil and Environmental Engineering

Email aalsha@coe.neu.edu

Office address 439 SN

Office phone 617-373-3994

Lab address 468 SN

Lab phone

Title of research assignment

Geo-environmental Engineering

Research abstract

The US EPA supports the adoption of “green” soil and groundwater remediation technologies, considering all environmental effects and incorporating strategies to maximize the net environmental benefit. Our long-term goal is to develop a green in situ remediation technology that is based on controlled manipulation of groundwater redox by conversion of solar energy into electrolysis through electrodes placed in aquifers to intercept contaminated groundwater. Electrolysis generates chemically oxidizing environment at the anode and chemically reducing environment at the cathode. The kinetics of electrolysis and release of electrolysis products can be optimized for effective transformation of contaminants under flowing groundwater conditions. The transformation may occur directly at the electrode surface or within the flowing groundwater as a byproduct of changes in redox conditions. The transformation depends on the electrode material, polarity and potential. Contaminants that can be transformed by this process include chromium, arsenic, nitrate, perchlorate, radionuclides (such as uranium and technetium), explosives (such as RDX) and organics (such as chlorinated and halogenated ethenes). Our work is currently focused on transformation that occurs within the groundwater rather than directly at the electrode surface.

