J Ind Environ Chem 2019, Volume 3
DOI: 10.4066/2591-7331-C1-009

Fenton reaction in porous media

Ambika S
National Institute of Technology, India

Emplacement of meso zero-valent iron particles (mZVI) in porous media to degrade organic pollutants (Phenol as model pollutant) in continuous column studies is first of its kind. Columns with different configurations varying in ZVI distribution and location of H_2O_2were investigated for factors influencing sustainable phenol removal. The performance of columns were in the ascending order of C > A > B > D where columns A and B had full-length ZVI distribution, C and D had half-length ZVI distribution, with H_2O_2 injection at initial conditions in A and C and at intermittent points in B and D. Distribution of mZVI particles in column C contributed 61-84% more interaction between Fe^{2+} ions and H_2O_2, promoted good radical generation and continuous corrosion, invigorated effective Fe^{2+}-Fe^{3+} cycling, retained active iron surface area and circumvented precipitation and secondary sludge production. The breakthrough curves showed that mZVI particles extended the active corrosion stage by 5 to 8 times and resulted in 3 to 7 times increment in mg phenol removed/mg mZVI along with 80% to 99.8% utilization of mZVI. Additional sand-only columns proved that Fenton's oxidation in in situ porous media can be improvised by 14% to 34% without incumbent addition of ZVI particles.

e:ambika@nitw.ac.in

Notes: