Nanoparticles for the removal of contaminants from groundwaters

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Nanoscale zero-valent iron particles (nZVI) have been studied in recent years as a promising technology for the remediation of contaminated aquifers. Specific positive features of nZVI are the high reactivity towards a broad range of contaminants and the possibility of injecting in aqueous slurries for a targeted remediation of contaminated areas. However, crucial points to be addressed are stability against aggregation, mobility in subsurface environments, and longevity. In this talk we present the current knowledge on the properties, reactivity and mobility in porous media of nZVI and their application to groundwater remediation. A specific focus is devoted to the methodologies to the colloidal stability of the nZVI slurries and to the available numerical tools for the simulation of laboratory and field scale mobility of the particles when injected in porous media. Examples of pilot scale application of nanoremediation will also be presented.