Reactive nanomaterials for groundwater treatment:
What we need to succeed

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Reactive nanoparticles such as Fe(0) (NZVI) are potentially attractive materials for remediating groundwater in situ, or for well head treatment (e.g. filters). NZVI, in particular, provides high rates of degradation for a great variety of potential groundwater contaminants to non-toxic products. Realizing the benefits of nanotechnology for degrading contaminants on water will require advances in three areas. 1) Selection of appropriate surface modifiers that enable subsurface emplacement for in situ treatment, but that do not adversely impact the particle's reactivity with the contaminant. 2) Identifying methods to make particles both high reactivity and high selectivity for the contaminants of interest such that the lifetime of the materials is sufficient to provide cost-effective treatment. 3) Methods to incorporate NPs into membranes such that they provide reactive surfaces that are resistant to fouling. This presentation will discuss progress made toward overcoming these challenges to using reactive nanoparticles for water decontamination, and will highlight the remaining challenges that must still be overcome to fully realize the benefits for nanotechnology for water treatment.