

Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) Degradation with Nano Zero Valent Iron (nZVI)

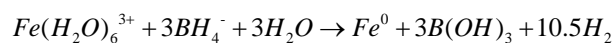
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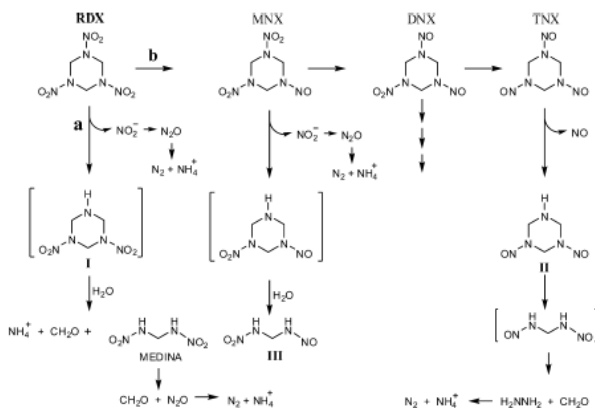
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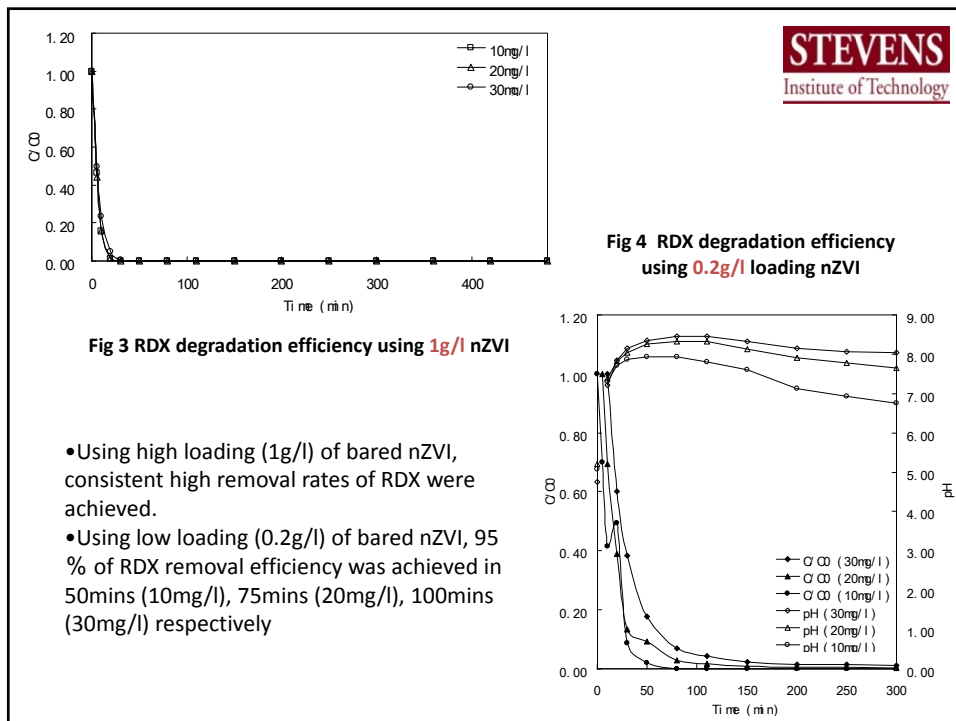
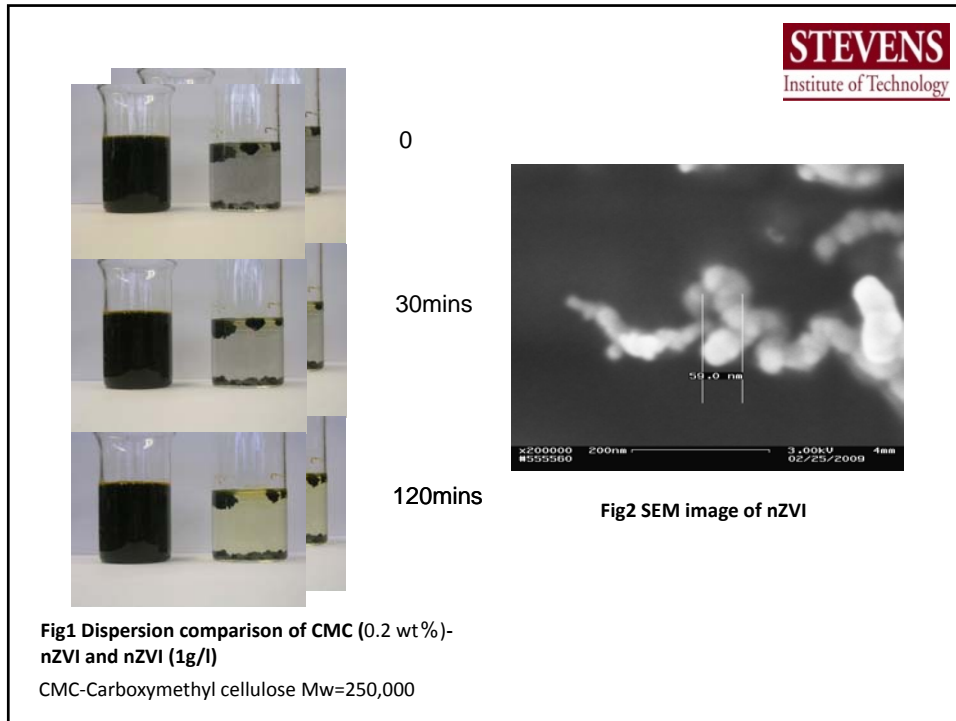
Materials & Methods

•nZVI Synthesis [Glavee, G.N., 1995]



•Degradation of RDX with nZVI and CMC-nZVI [NAIA, G., 2008]





CMC-nZVI results

- CMC (0.2 wt%) coated nZVI (1g/l) was reacted with RDX solution (5mg/l). RDX concentrations were below detection limits in less than 30 mins. Similar removal efficiencies were achieved using bared nZVI
- CMC (0.02 wt%) coated nZVI (0.1g/l) decreased RDX concentration from 20mg/l to 3.3mg/l in 3 hours. But bared nZVI (0.2g/l) removed 95 % RDX in 60 mins.

Pros and Cons

- nZVI and CMC-nZVI achieved good performance for RDX degradation in water
- Low loading bared nZVI was more efficient for the removal of RDX than CMC coated nZVI, but bared nZVI has limited mobility in water
- CMC-nZVI disperse well in aqueous phase, it has the potential to be delivered in water-saturated porous media to the contaminated zone

Next steps

- Different concentrations of CMC will be used to coat nZVI to explore their dispersion ability and removal efficiency of RDX
- pH dependent polymers will be developed to optimize removal efficiency and transport ability of nZVI
- The degradation byproducts will be identified