

## MIGRATION AND FATE OF NZVI IN THE GROUNDWATER CONDITIONS

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### Abstract

Many recent studies illustrate the removal of wide range of organic and inorganic contaminants from the real groundwater environment using nanoscale zero-valent iron (nZVI) particles. The decontamination processes are significantly connected with nZVI ability to migrate within groundwater at the polluted areas. What is also important is its fate after application to the groundwater and the transformation towards oxidized products. One of the pilot test is situated in an industrial factory Spolchemie, Ústí nad Labem (Czech Republic), which has a long-term chemical production history. Recently, the contaminated groundwater is treated by nZVI applied into array of wells. Groundwater and sediments were sampled from the bottom of 3 monitoring wells periodically during 7 months. The key characteristics of samples, for instance: total concentration of iron, particle size, morphology and form of iron/iron oxides were evaluated by combination of experimental techniques - AAS, SEM, TEM, XRD and Mössbauer spectroscopy. Generally, results from samples analyses proved good migration ability of nZVI and their concentration depends on the distance of application sites to the monitoring wells. Transformed products of applied nZVI such as ferric/ferrous oxides were determined in the selected samples. The gathered information about nZVI migration and fate is crucial for future remediation actions based on nZVI. Monitoring the behaviour of nZVI during remediation processes for sufficiently long time could lead to get information where and how can be nZVI spread during remediation processes or an exclusion of potentially dangerous effects on the environment.

**Keywords:** Groundwater, migration, monitoring, nZVI

### ACKNOWLEDGEMENTS

*This work was supported by grants from the EU FP7 (project NANOREM) and TAČR ("Competence Centres", project No. TE01020218).*

**Author did not supply full text of the paper.**