

Electronic Supplementary Information for

# Nanoparticulate Zero-Valent Iron Coupled with Polyphosphate: The Sequential Redox Treatment of Organic Compounds, Stability and Bacterial Toxicity

Hak-Hyeon Kim<sup>1</sup>, Min Sik Kim<sup>1</sup>, Hyung-Eun Kim<sup>1</sup>, Hye-Jin Lee<sup>1</sup>, Min-Hee Jang<sup>2</sup>, Jaemin Choi<sup>1</sup>, Yusik Hwang<sup>2</sup>, Changha Lee<sup>1\*</sup>

*<sup>1</sup>School of Urban and Environmental Engineering, Ulsan National Institute of Science and Technology (UNIST), 50 UNIST-gil, Ulsu-gun, Ulsan, 44919, Republic of Korea*

*<sup>2</sup>Gyeongnam Department of Environmental Toxicology and Chemistry, Korea Institute of Toxicology (KIT), 17 Jegok-gil, Munsan-eup, Jinju, Gyeongsangnam-do, 52834, Republic of Korea*

\*Corresponding author

Tel.: 82-52-217-2812

Fax: 82-52-217-2809

E-mail:

[clee@unist.ac.kr](mailto:clee@unist.ac.kr)

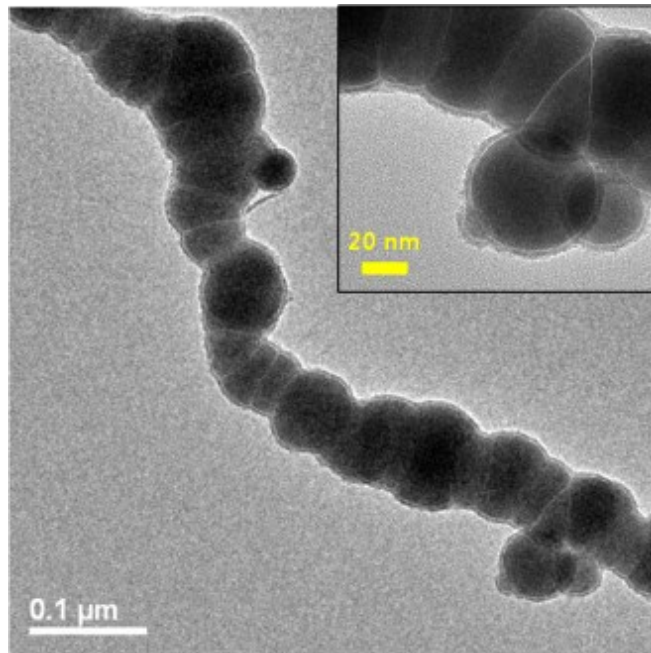


Fig. S1. TEM image of nZVI

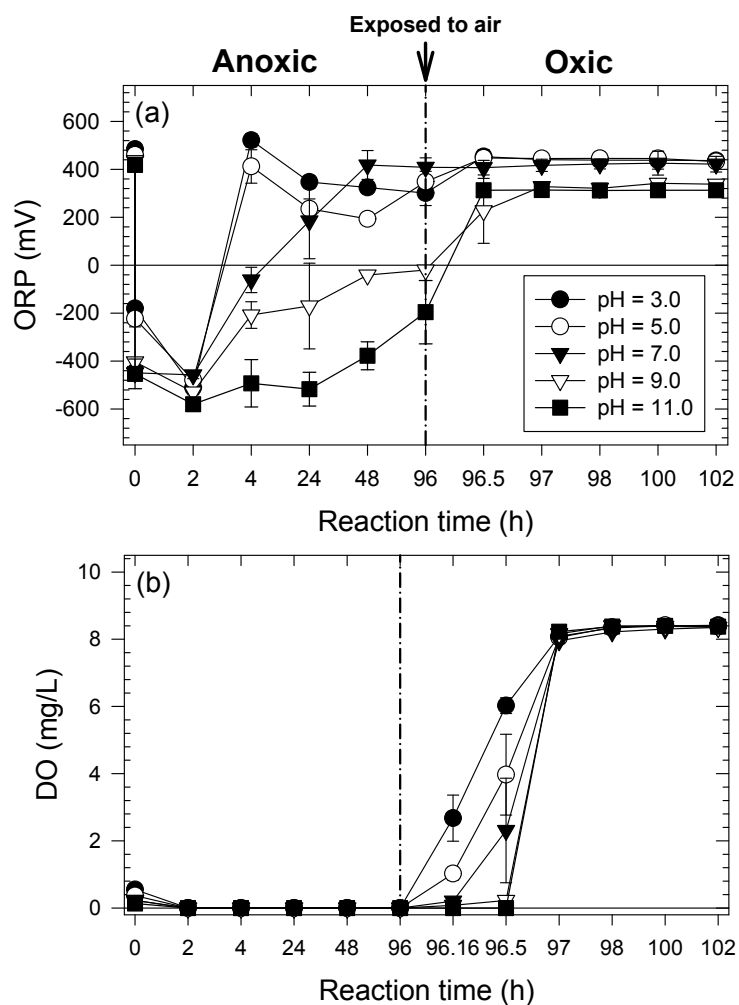


Fig. S2. Variations of ORP (a) and DO concentration (b) during sequential redox treatment of PCP at different pH values ( $[\text{PCP}]_0 = 0.01 \text{ mM}$ ;  $[\text{nZVI}]_0 = 100 \text{ mg/L}$  ( $1.7 \text{ mM}$  as Fe);  $[\text{TPP}]_0 = 8.36 \text{ mM}$ ).

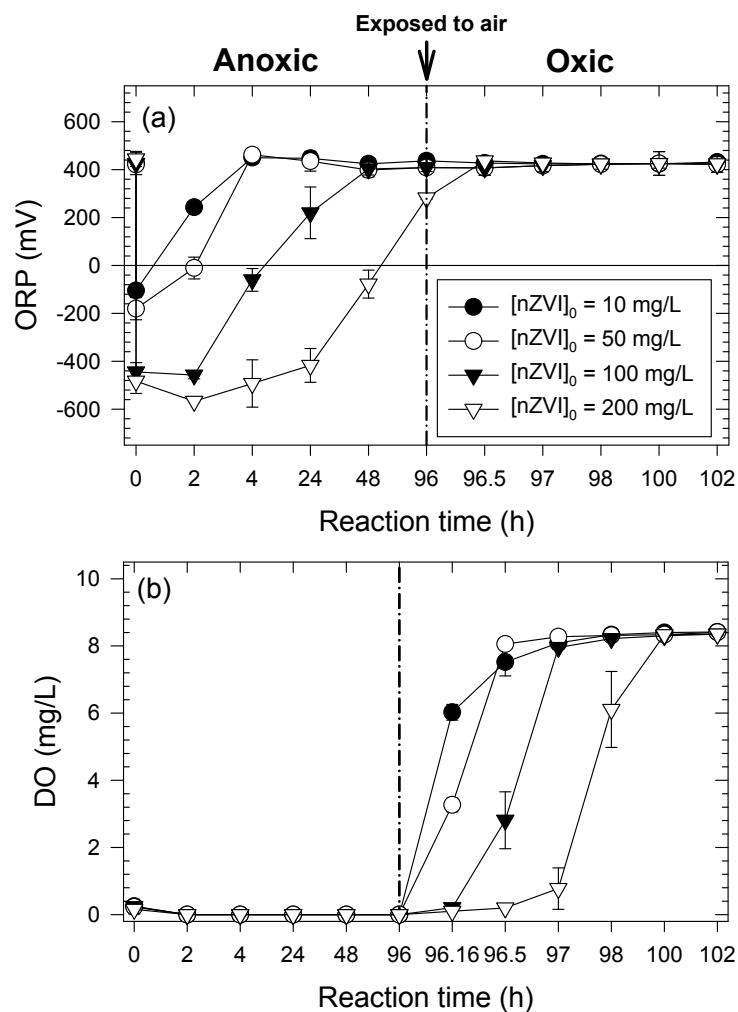


Fig. S3. Variations of ORP (a) and DO concentration (b) during sequential redox treatment of PCP at different nZVI doses ( $[\text{PCP}]_0 = 0.01 \text{ mM}$ ;  $[\text{nZVI}]:[\text{TPP}] = 1 : 5$  (molar ratio);  $\text{pH} = 7.0$ ).

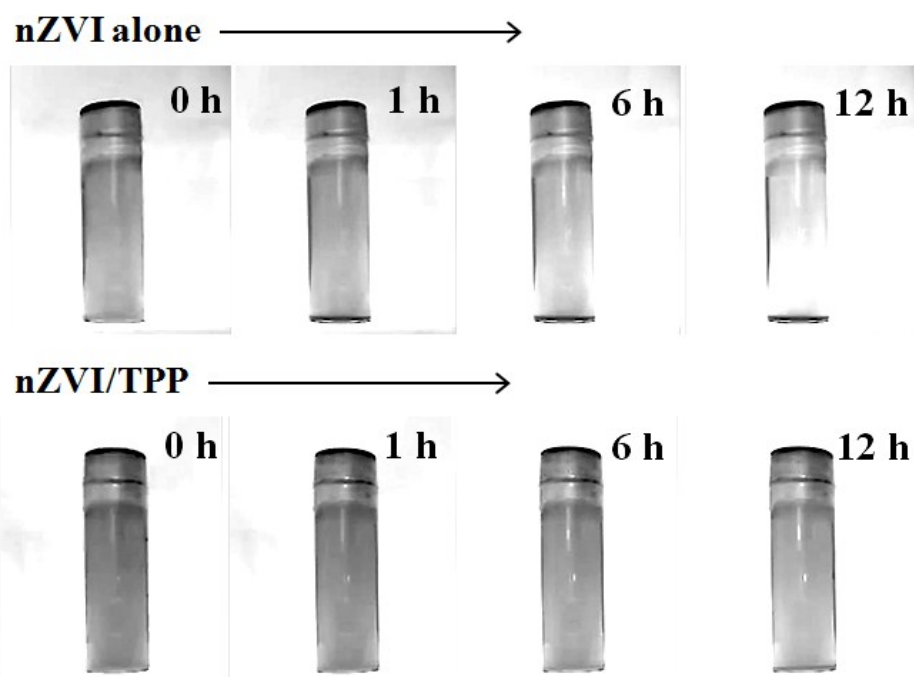


Fig. S4. Image of nZVI sedimentation in the presence and absence of TPP (100 mg/L (1.7 mM as Fe));  $[TPP]_0 = 8.36$  mM; 30 min for pre-sonication;  $N_2$  condition; Reaction time = 12 h).

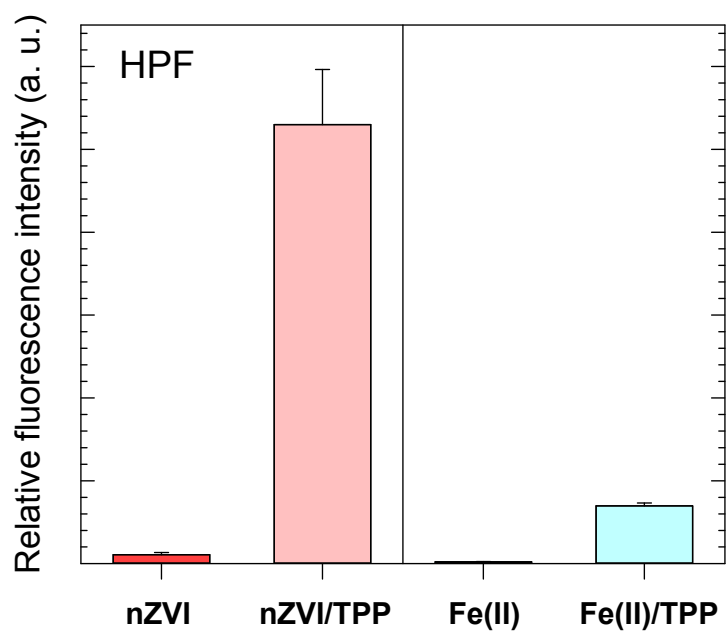


Fig. S5. Detection of cell-free ROS generation by iron/TPP system ( $[\text{HPF}]_0 = 0.1 \text{ mM}$ ;  $[\text{PIPES}]_0 = 1 \text{ mM}$ ;  $[\text{nZVI}]_0 = 100 \text{ mg/L}$  (1.7 mM as Fe),  $[\text{Fe(II)}]_0 = 1.7 \text{ mM}$ ;  $[\text{TPP}]_0 = 8.36 \text{ mM}$ ; pH = 7.0; Reaction time = 60 min).