Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Electronic Supporting Information

Boron doped reduced graphene oxide based bimetallic Ni/Fe nanohybrids for rapid dechlorination of trichloroethylene

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Table S1 Determination of composition of B-rGO/Fe/Ni from thermogravimetry.

Materials	**Initial weight (%)**	**Residual weight (%)**	**Residue**	**Weight ratio**
B-rGO	100	38.3	Boron and carbon	100%
B-rGO/Fe/Ni	100	76.9	Boron and carbon	37.4%
			Fe/Ni bimetal	62.6%

Table S2. The comparison of pseudo-first order rate constant (k_{obs}) for TCE dechlorination by bimetallic Fe/Ni nanoparticles immobilized onto different supports under anoxic conditions.

Bimetallic nanomaterials	pH	k_{obs} (h^{-1})	References
Free Fe/Ni		8.2	
B-rGO/Fe/Ni (5%)	7.0	10.9	This study
B-rGO/Fe/Ni (5%) (mass normalized)		18.1	
Zeolite/Fe/Ni	N.A	2.2	38
Fe/Ni (10%)	6.5	1.2	
Fe/Ni (22%)	7.0	3.0	39
Fe/Ni (50%)	7.5	0.36	
Polystyrene resin/Fe/Ni (10%)		5.84	
Polystyrene resin/Fe/Ni (20%)	7.0	6.95	25
Polystyrene resin/Fe/Ni (25%)		6.40	
Fe/Ni/nylon-66		6.47	
Fe/Ni/PVDF	7.0	1.77	8
Fe/Ni/MCEM		1.04	
Fe/Ni/Millex GS membranes		0.56	
Free Fe/Ni (5%)	8.2 ± 0.1	0.0984	40
Bentonite/Fe/Ni (5%)		0.181	

N.A.: not available.

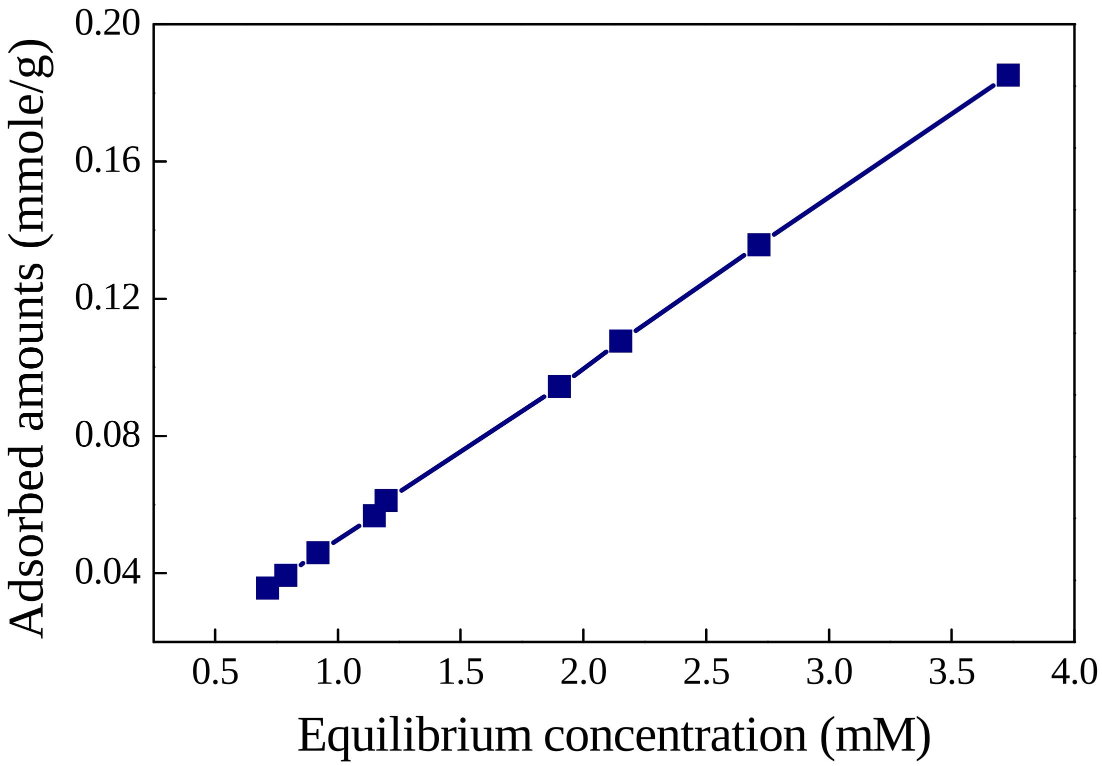


Figure S1 Adsorption isotherm of ferric ions by B-rGO under anoxic conditions .

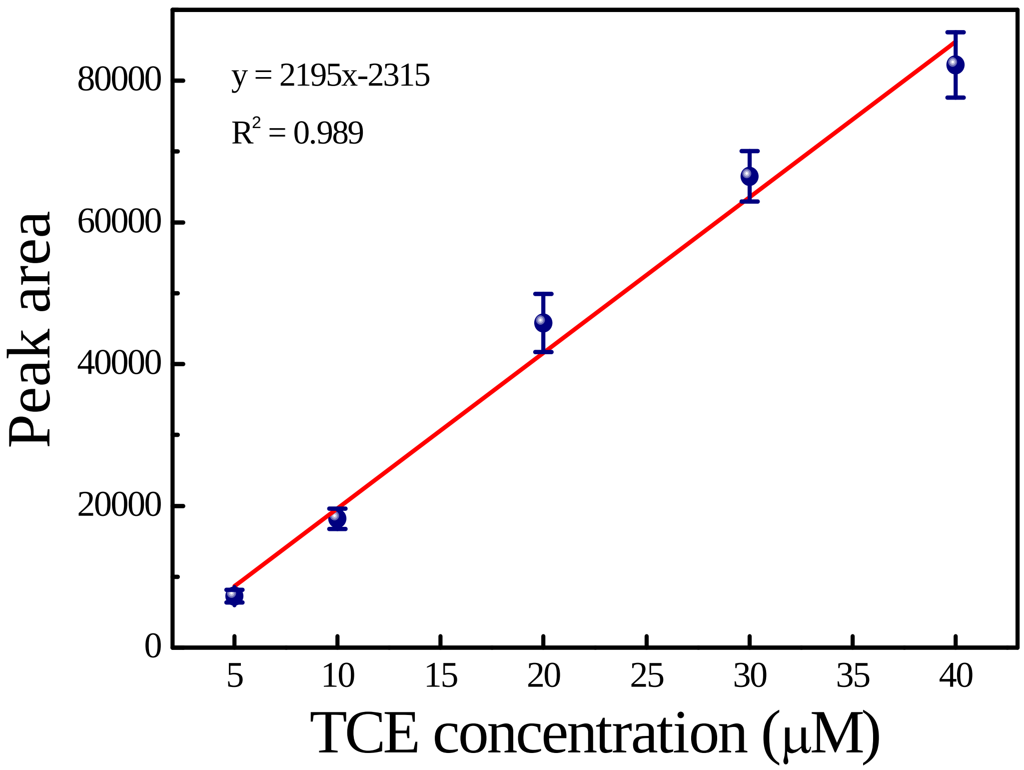
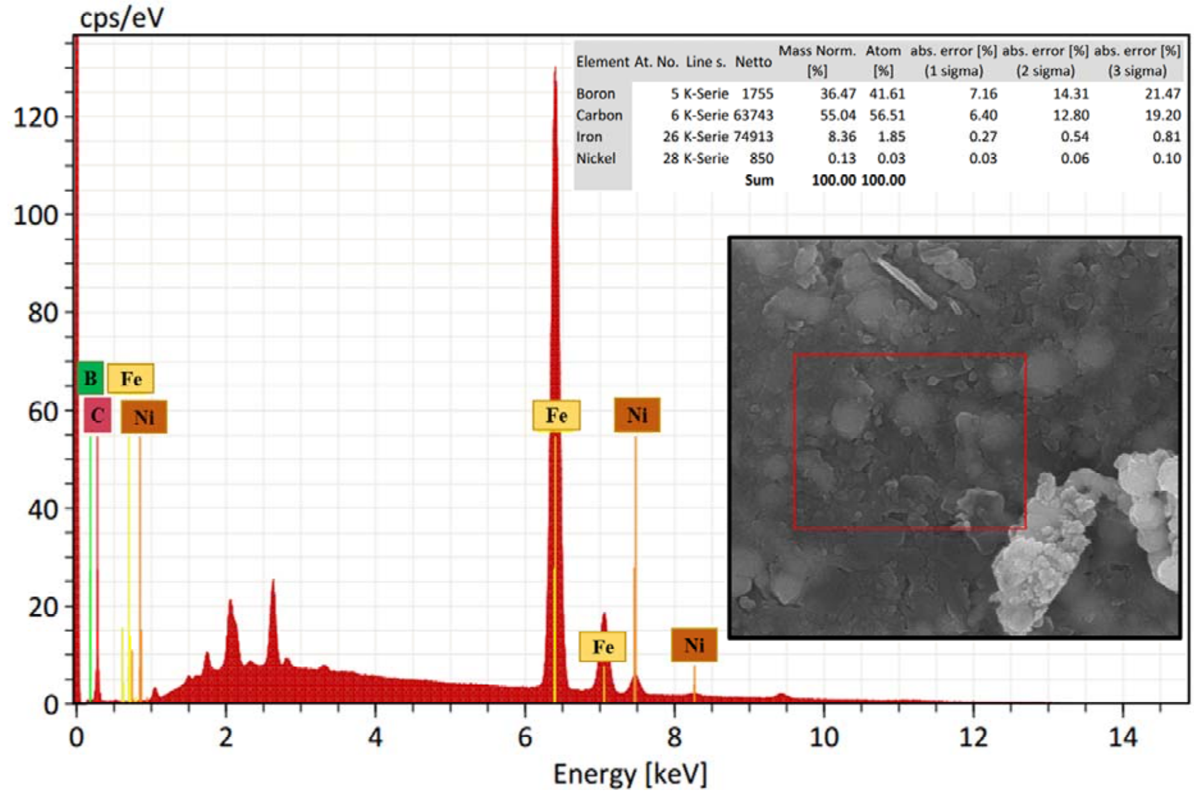


Figure S2. The calibration curve of TCE prepared by using the external standard method with the known concentrations of TCE in aqueous solutions.



Element	At. No.	Line s.	Netto	Mass Norm. [%]	Atom [%]	abs. error [%] (1 sigma)	abs. error [%] (2 sigma)	abs. error [%] (3 sigma)
Boron	5	K-Serie	1755	36.47	41.61	7.16	14.31	21.47
Carbon	6	K-Serie	63743	55.04	56.51	6.40	12.80	19.20
Iron	26	K-Serie	74913	8.36	1.85	0.27	0.54	0.81
Nickel	28	K-Serie	850	0.13	0.03	0.03	0.06	0.10
			Sum	**100.00**	**100.00**			

Figure S3. The energy-dispersive X-ray spectra (EDS) of B-rGO/Fe/Ni nanocomposites. Inset is the analytical area of SEM image for EDS.

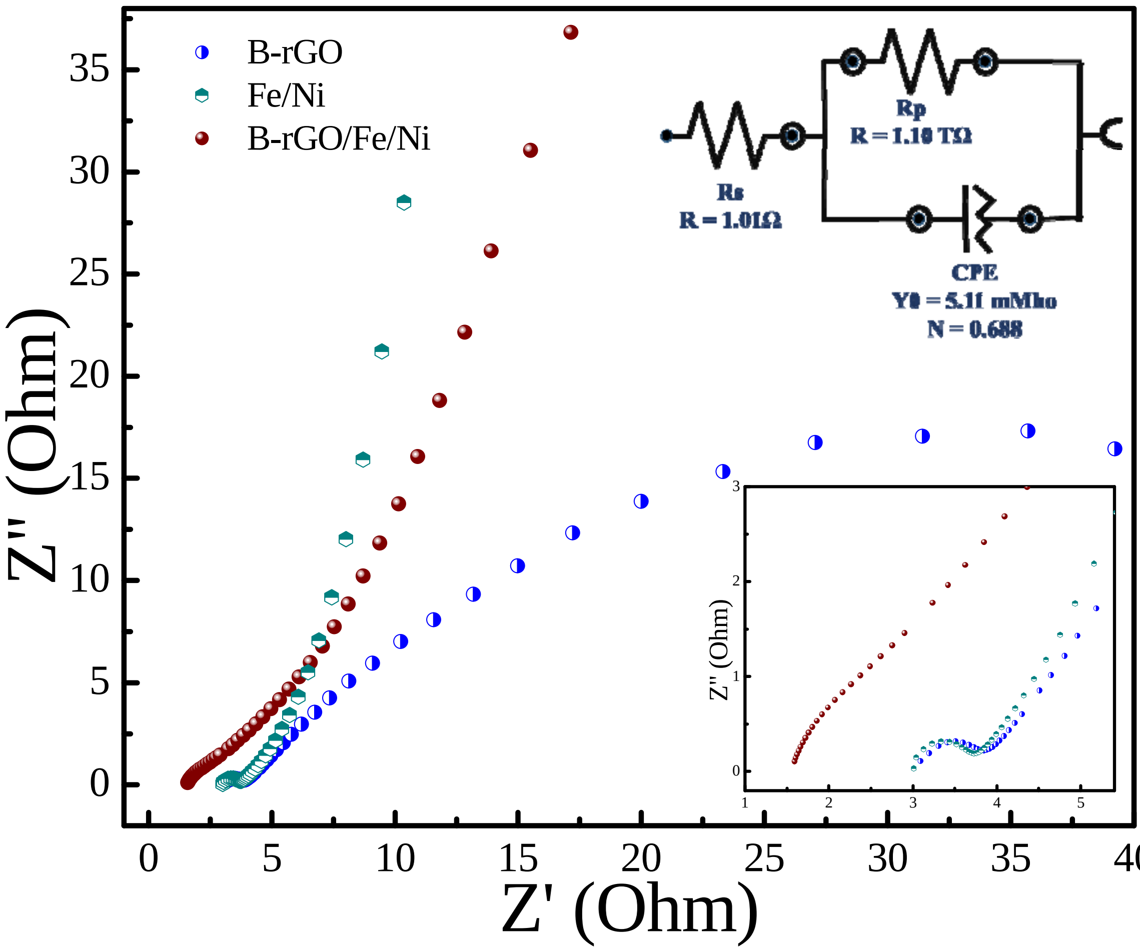


Figure S4. The Nyquist plot of B-rGO, Fe/Ni and B-rGO/Fe/Ni nanocomposites by using 1.0 M Na_2SO_4 as the electrolyte.

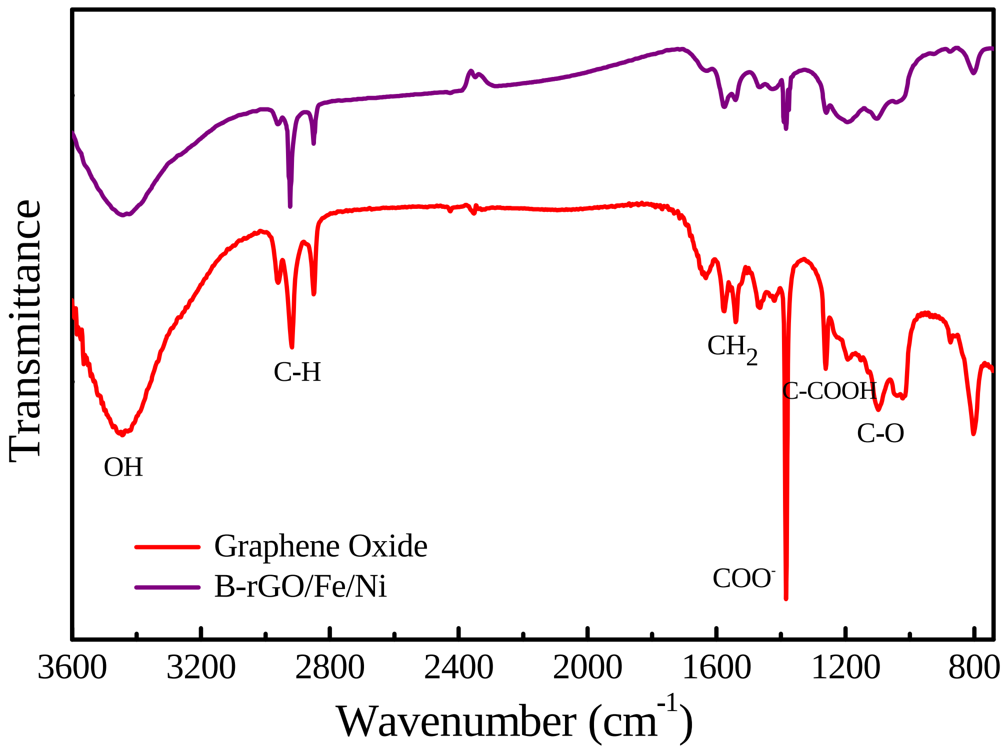


Figure S5. FTIR spectra of GO and B-rGO/Fe/Ni nanocomposites.

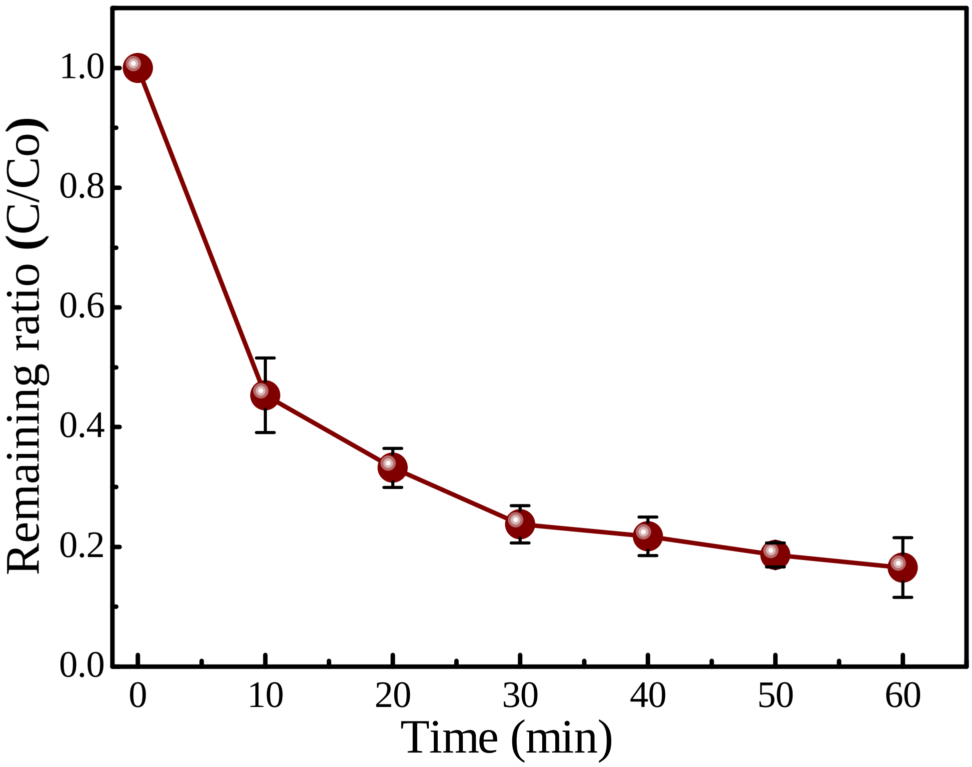


Figure S6. Dechlorination of 20 μM TCE by 1.0 g/L graphene oxide immobilized Fe/Ni nanocomposite at pH 7 under anoxic conditions.

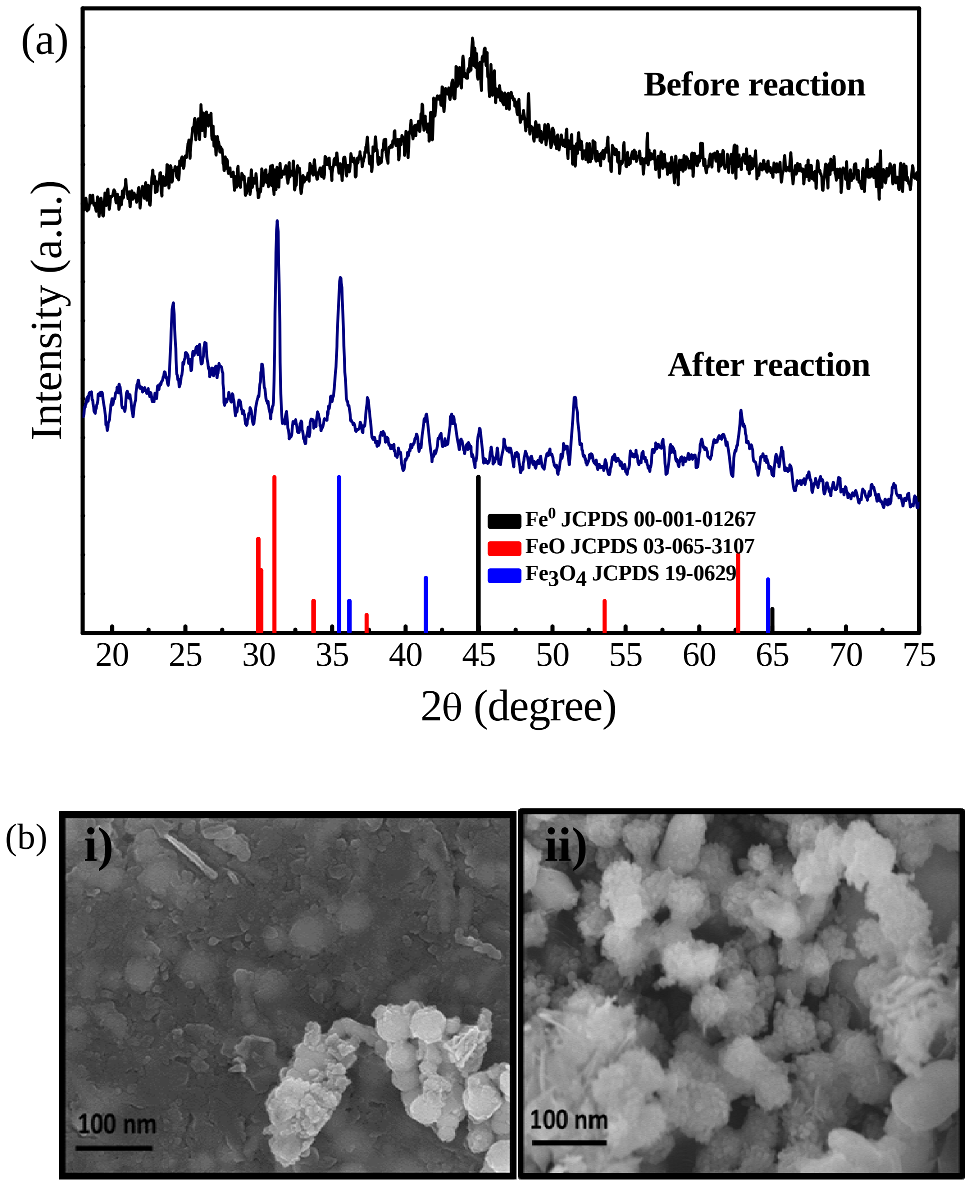


Figure S7. The (a) XRD patterns and (b) SEM images of B-rGO/Fe/Ni nanocomposite before and after the dechlorination of TCE at pH 7 under anoxic conditions.