

**Table S1.** Band Positions (cm<sup>-1</sup>) for EG and Functionalized EG nZVI.

| Compound | Band positions (cm <sup>-1</sup> )   |
|----------|--|
| EG       | <u>960.5</u> , <u>1,157.5</u> , 1,275.6, <u>1,405.2</u> , 1,608.2, 2,783.1, <u>3,137.6</u> |
| nZVI-EG  | <u>991.7</u> , <u>1,168.6</u> , <u>1,400.7</u> , 1,635.5, <u>3,126.5</u>                   |

Underlined wave numbers represent the characteristic bands of EG, while underlined and bold wave numbers represent the wave numbers for O-H and C-O-H stretching vibrational mode. These results are typical for EG.

**Table S2.** Size Distribution Statistical Parameters of ZVI Materials in nm

| Sample                    | Mean  | CV (%) | FWHM  | D <sub>10</sub> | D <sub>50</sub> | D <sub>90</sub> | D <sub>50</sub> -D <sub>10</sub> | Span  |
|---------------------------|-------|--------|-------|-----------------|-----------------|-----------------|----------------------------------|-------|
| nZVI-EG <sub>non-aq</sub> | 4.23  | 7.47   | 2.81  | 2.38            | 3.90            | 6.10            | 1.52                             | 3.72  |
| S-nZVI <sub>non-aq</sub>  | 23.68 | 59.4   | 33.17 | 8.31            | 22.01           | 35.15           | 13.70                            | 26.84 |
| nZVI-EG <sub>aq</sub>     | 55.14 | 27.84  | 37.59 | 30.32           | 52.66           | 71.70           | 22.34                            | 41.38 |

**Table S3.** Rietveld Refinement of a Sample Zero-valent Iron Nanoparticle

| Sample                    | $\alpha$ -Fe % in<br>weight | Fe <sub>3</sub> O <sub>4</sub> % in<br>weight |
|---------------------------|-----------------------------|---|
| nZVI-EG <sub>non-aq</sub> | 86.42                       | 13.58   |
| S-nZVI <sub>non-aq</sub>  | 81.02                       | 18.98   |
| nZVI-EG <sub>aq</sub>     | 98.87                       | 1.13  |