

# HRTEM analysis of Fe/SiO<sub>2</sub> catalyst synthesized by atomic layer deposition for CO oxidation reaction

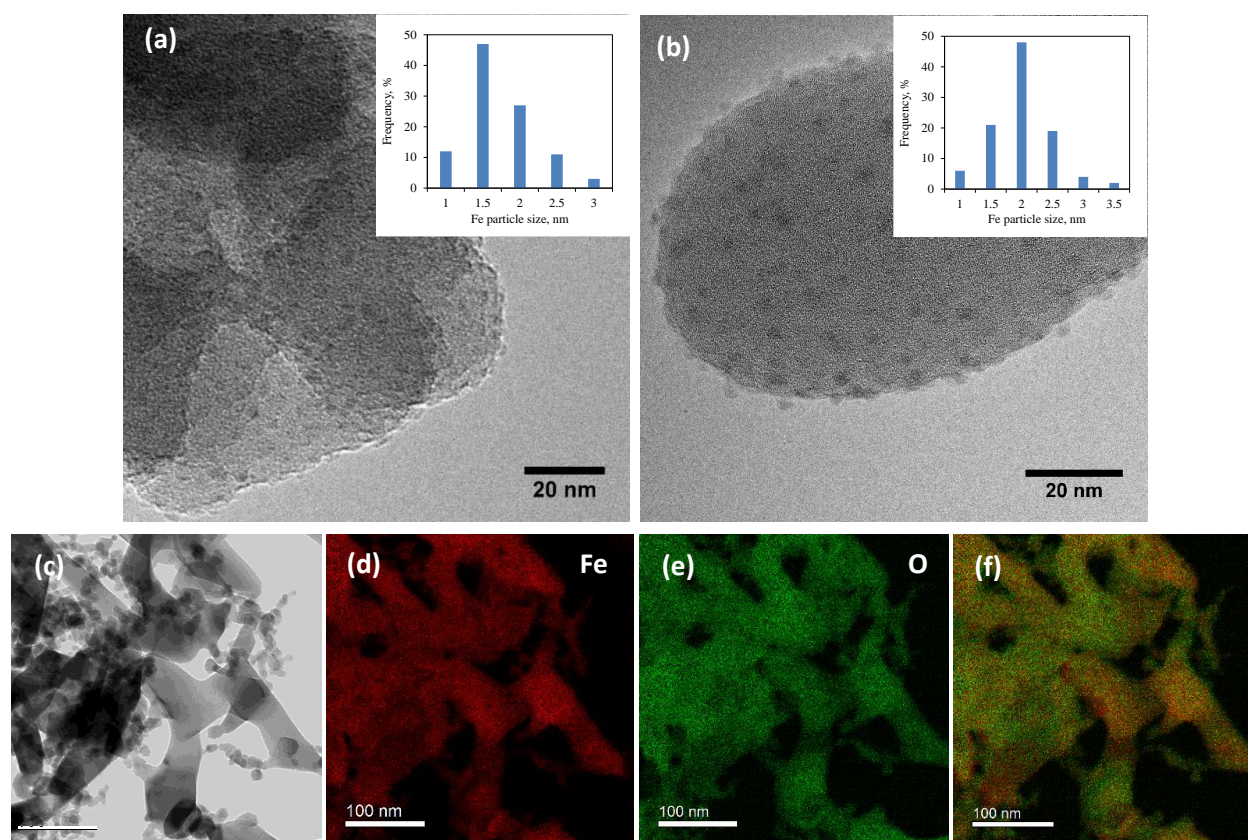
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Dr. He and I performed TEM analysis for Fe/SiO<sub>2</sub> samples before and after CO oxidation reactions. Fig. 1a shows the highly dispersed Fe nanoparticles (NPs) on the surface of SiO<sub>2</sub> NPs, with an average particle size of 1.5 nm. As presented in Fig. 1b, the Fe NPs were still highly dispersed on SiO<sub>2</sub> after 4 cycles of CO oxidation reaction though the Fe average particle size increased to 1.8 nm. However, as shown in Fig. 1c-f, there were some large particles (> 30 nm) and they were aggregated Fe<sub>2</sub>O<sub>3</sub> NPs since only Fe and O were detected based on electron energy loss spectroscopy (EELS) results and no Si was detected. The results have been submitted to *Green Chemistry* and *AIChE Journal* separately.



**Figure 1.** TEM images of (a) Fe/SiO<sub>2</sub> catalyst and (b) Fe/SiO<sub>2</sub> after 4 cycles of CO oxidation reaction (The *inset* figure shows the size distribution of Fe NPs); Fe/SiO<sub>2</sub> HRTEM image (c) and the correlative EFTEM mapping of Fe (d, red), O (e, green) and overlay (f) of Fe/SiO<sub>2</sub> of the sample after 300 hr of CO oxidation reaction.