Expeditious organic-free assembly: morphologically controlled synthesis of iron oxides using microwaves

Jiahui Kou* and Rajender S. Varma*

Sustainable Technology Division, National Risk Management Research Laboratory, U.S. Environmental Protection Agency, 26 West Martin Luther King Drive, MS 443, Cincinnati, Ohio 45268, USA. E-mail: Varma.Rajender@epa.gov; koujiahui@gmail.com

Table S1. Summary of synthetic results.

No.	$FeSO_4/FeCl_3$(mmol)	NaOH	Time	Product
1	1.5/0	0 g	30 min	Fe_2O_3
2	1/0.5	0 g	30 min	Fe_2O_3/β-FeOOH
3	0.5/1	0 g	30 min	β-FeOOH
4	0.25/1.25	0 g	30 min	Fe_2O_3/ β-FeOOH
5	0/1.5	0 g	30 min	Fe_2O_3/ β-FeOOH
6	1.5/0	0.1 g	30 min	$Fe(OH)_3/Fe(OH)_2$/ $Fe_2O_3 \cdot 0.5H_2O$
7	0.5/1	0.1 g	30 min	Fe_2O_3
8	0/1.5	0.1 g	30 min	Fe_2O_3
9	0.5/1	0 g	2 min	β-FeOOH
10	1.5/0	0 g	2 min	Fe_2O_3

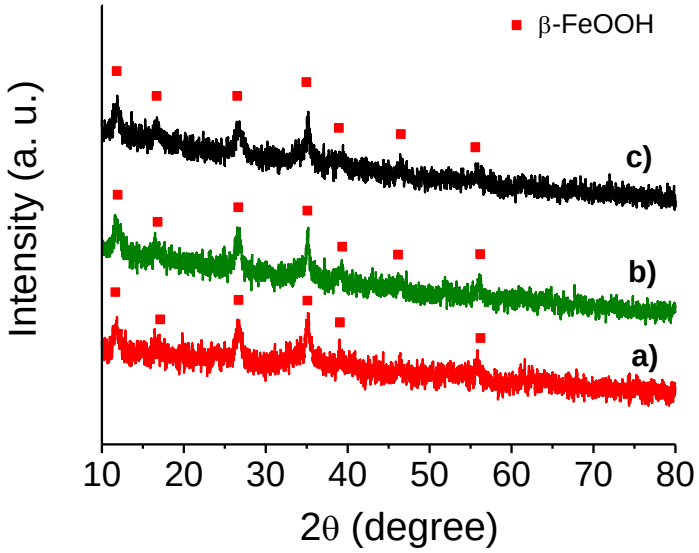

Fig. S1. XRD patterns of prepared samples in the absence of NaOH. a) 2 min; b) 30 min; c) 120 min.

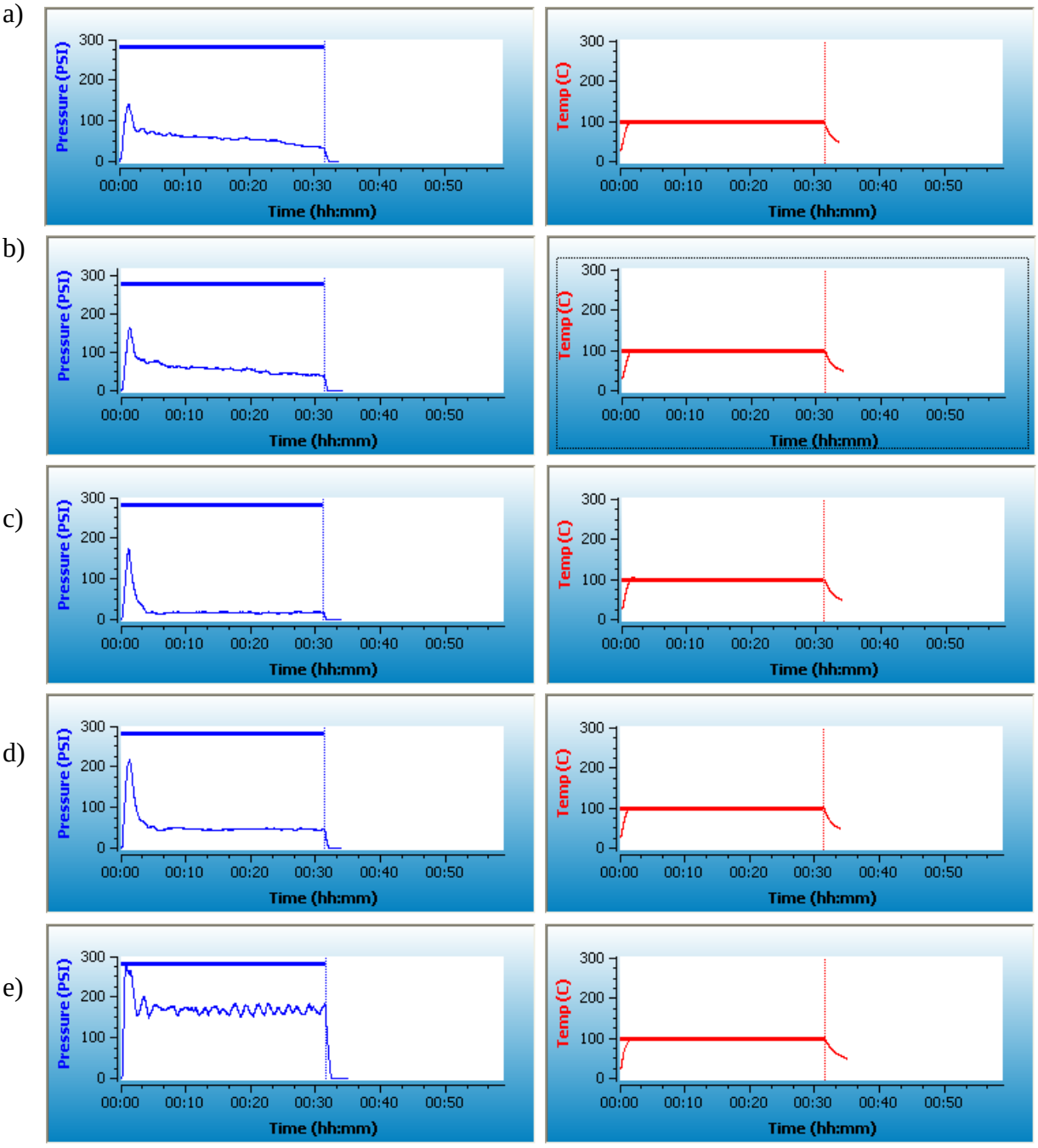

Fig. S2. Reaction profile of the microwave system without stirring. a) 1.5 mmol $FeCl_3$; b) 1.25 mmol $FeCl_3$ and 0.25 mmol $FeSO_4$; c) 1mmol $FeCl_3$ and 0.5 mmol $FeSO_4$; d) 0.5 mmol $FeCl_3$ and 1 mmol $FeSO_4$; e) 1.5 mmol $FeSO_4$.

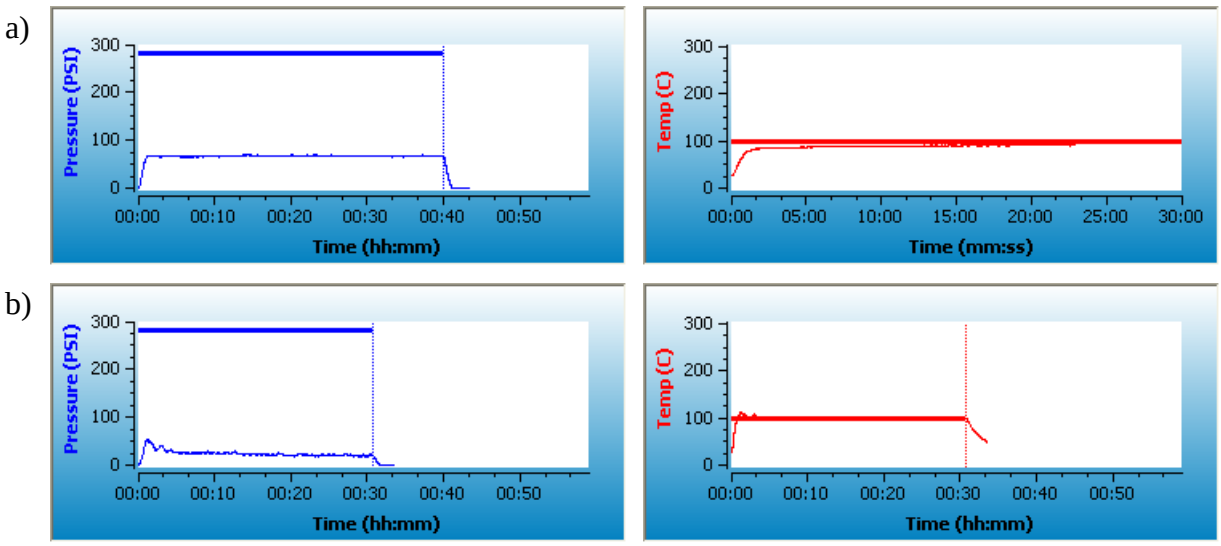

Fig. S3. Reaction profile of the microwave system. a) Pure water without stirring; b) 1.5 mmol $FeSO_4$ with stirring.

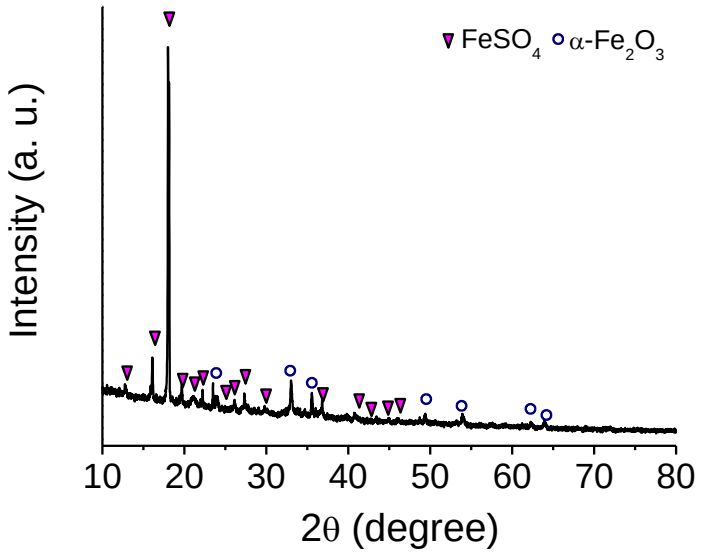

Fig. S4. XRD patterns of samples obtained with stirring in the presence of 1.5 mmol $FeSO_4$.