

Effects of silica shell encapsulated nanocrystals on active χ -Fe₅C₂ phase and Fischer-Tropsch synthesis

Seunghee Cha¹, Heewon Kim¹, Hyunkyung Choi², Chul Sung Kim², and Kyoung-Su Ha^{1,*}

¹ Department of Chemical and Biomolecular Engineering, Sogang University, 35 Baekbeom-Ro, Mapo-Gu, Seoul 04107, Republic of Korea;

² Department of Physics, Kookmin University, 77 Jeongneung-ro, Seongbuk-gu, Seoul, 02707, Republic of Korea

*

Correspondence: K.-S. Ha; philoseus@sogang.ac.kr; Tel.: +82-2-3274-4859

List of SI

Figure S1. XRD result of χ -Fe₅C₂ nanoparticles.

Figure S2. XPS spectra of Fe 2p for χ -Fe₅C₂ @SiO₂ catalysts.

Figure S3. XRD results of fresh and spent χ -Fe₅C₂ @SiO₂-H catalysts.

Table S1. N₂ physisorption results of fresh and spent χ -Fe₅C₂@SiO₂ catalysts.

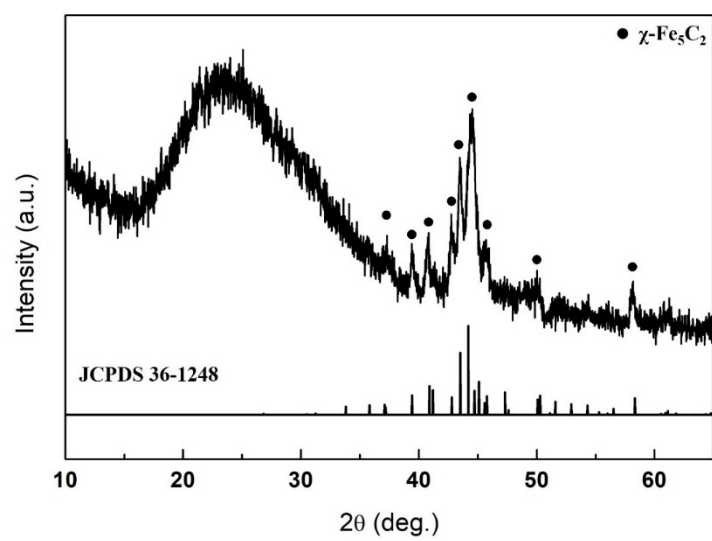


Figure S1. XRD result of χ -Fe₃C₂ nanoparticles.

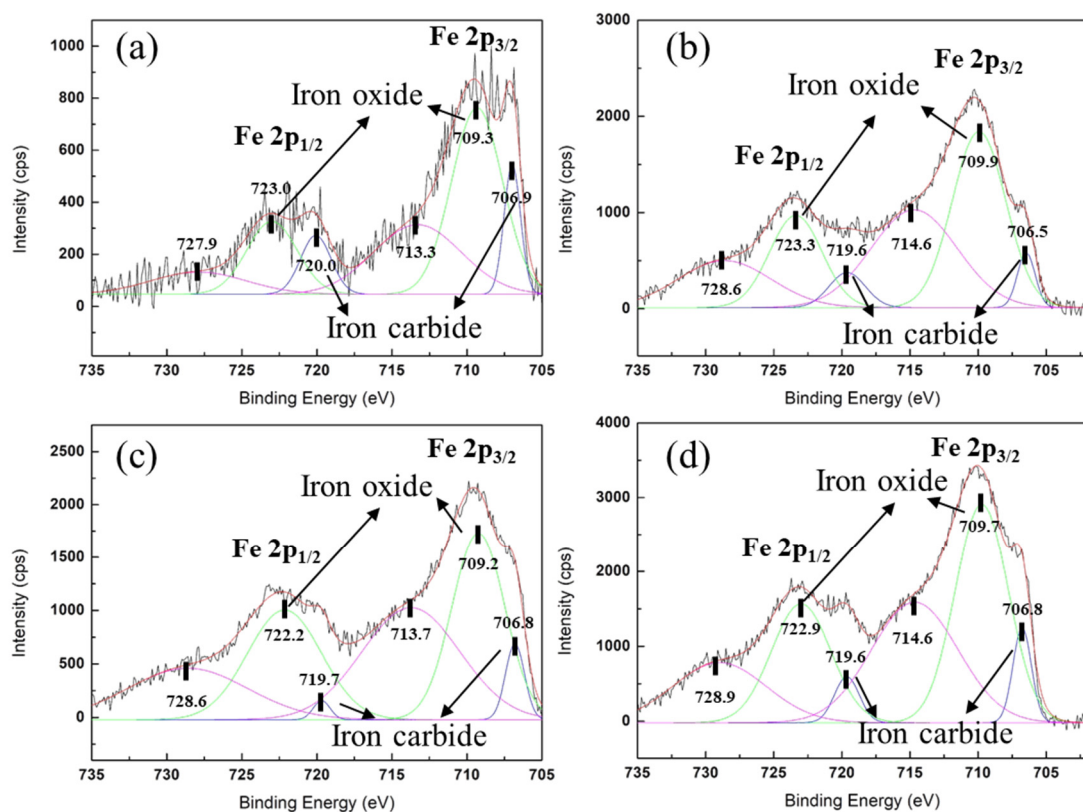


Figure S2. XPS spectra of Fe 2p for (a) fresh χ -Fe₅C₂@SiO₂_L catalyst, (b) spent χ -Fe₅C₂@SiO₂_L catalyst, (c) fresh χ -Fe₅C₂@SiO₂_H catalyst, and (d) spent χ -Fe₅C₂@SiO₂_H catalyst after deconvolution.

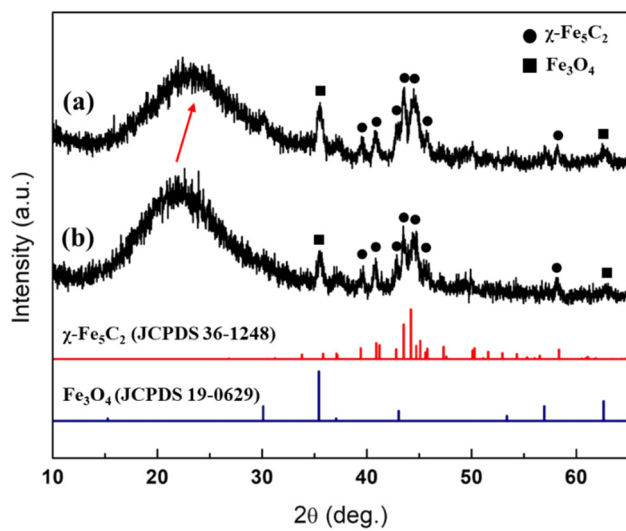


Figure S3. XRD results of fresh and spent $\gamma\text{-Fe}_5\text{C}_2$ @ $\text{SiO}_2\text{-H}$ catalysts. (a) spent catalyst, (b) fresh catalyst.

Table S1. N₂ physisorption results of fresh and spent χ -Fe₅C₂@SiO₂ catalysts.

Sample	S _{BET} [m ² /g]	V _p [cm ³ /g]	Average d _p [nm]	Mesopore d _p [nm] ^a
Fresh χ -Fe ₅ C ₂ @SiO ₂ _L	301	0.5	7.0	2.3
Spent χ -Fe ₅ C ₂ @SiO ₂ _L	880	1.0	4.1	2.6
Fresh χ -Fe ₅ C ₂ @SiO ₂ _H	238	0.3	5.7	2.2
Spent χ -Fe ₅ C ₂ @SiO ₂ _H	766	0.8	3.9	2.5

^a Mesopore d_p was calculated with the pores below 10 nm.