Electronic Supplementary Material (ESI) for CrystEngComm.

A Versatile Synthetic Approach for the Synthesis of CoO, CoxC, and Co based Nanocomposites: Tuning Kinetics and Crystal Phase with Different Polyhydric Alcohols

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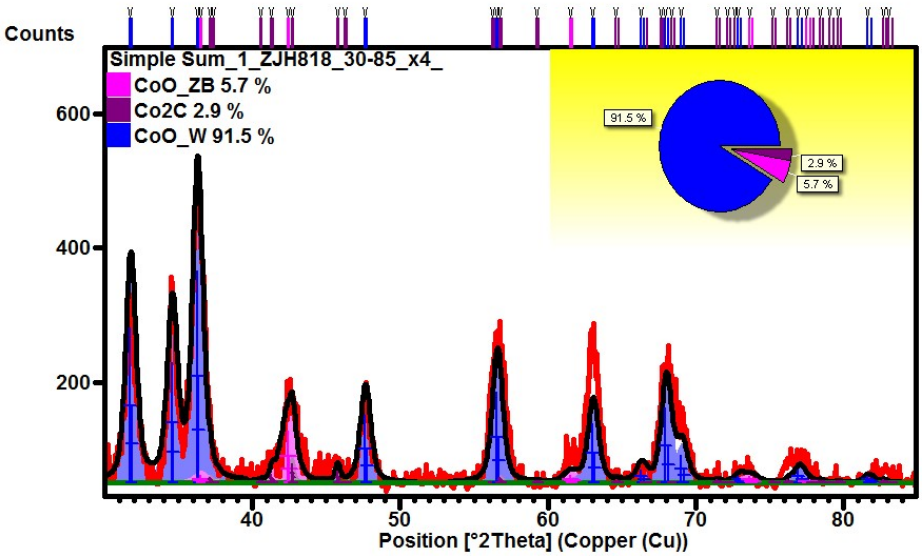
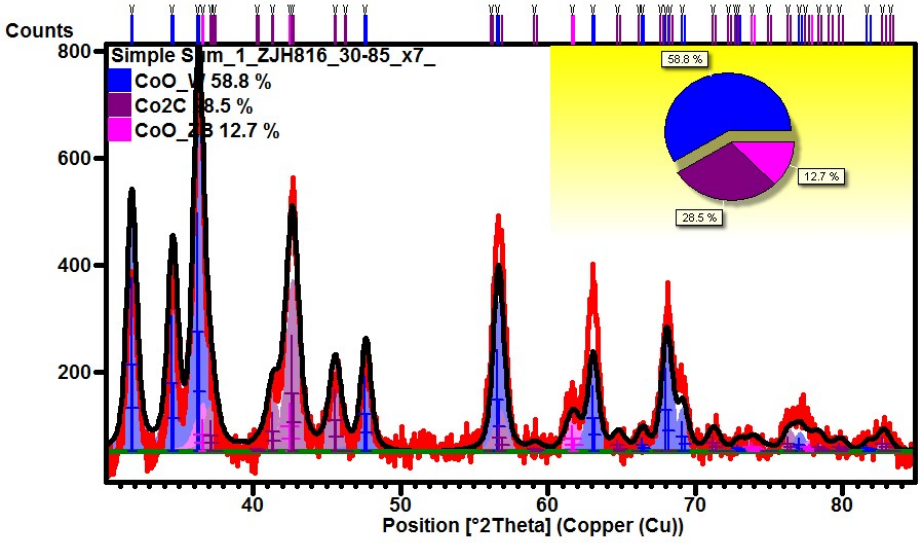
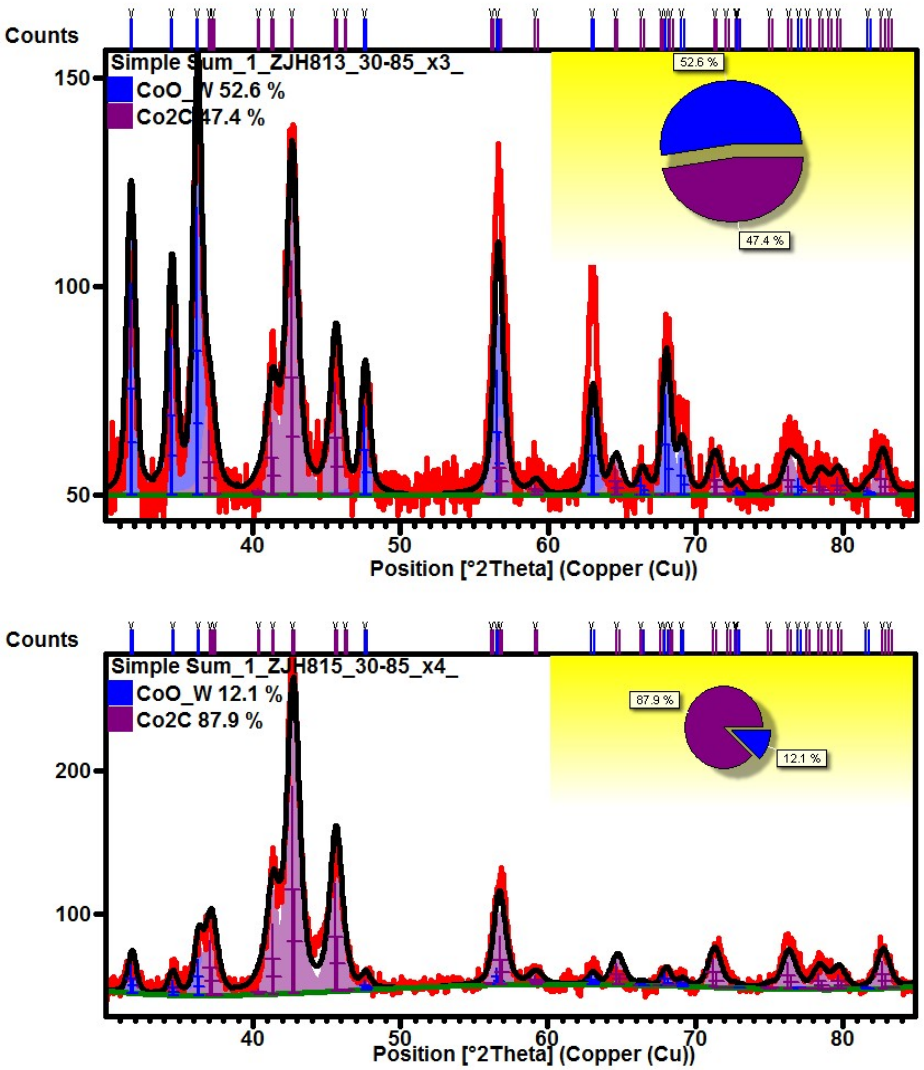
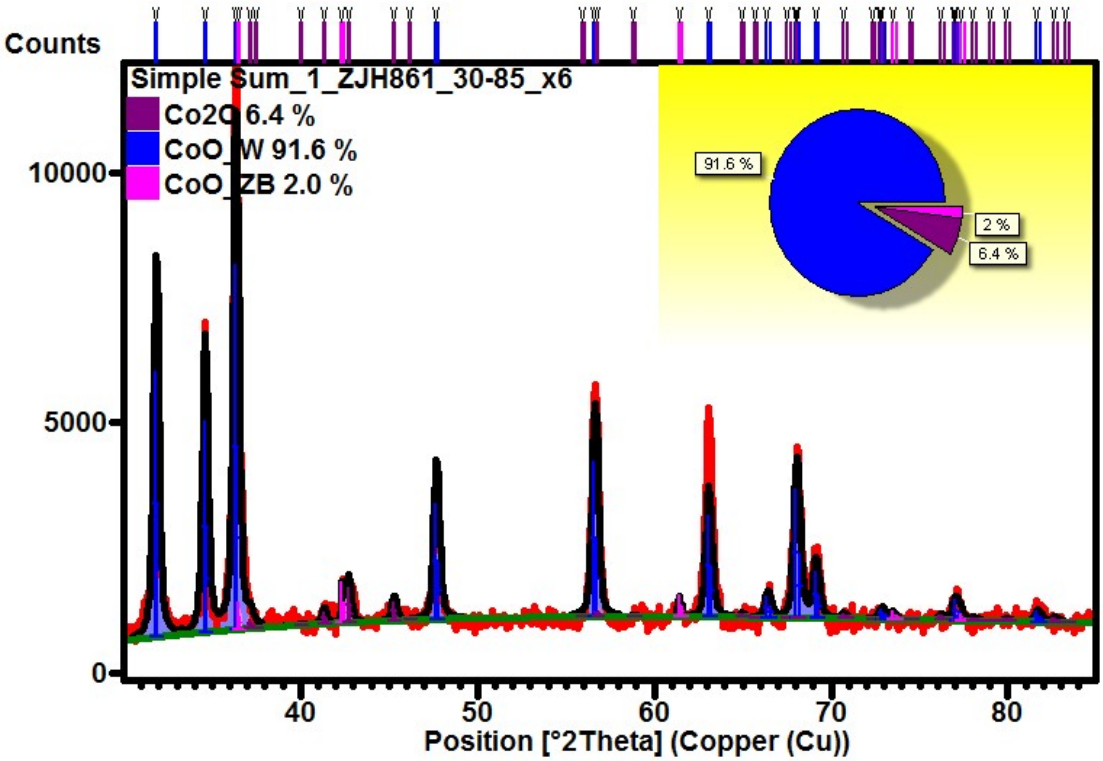
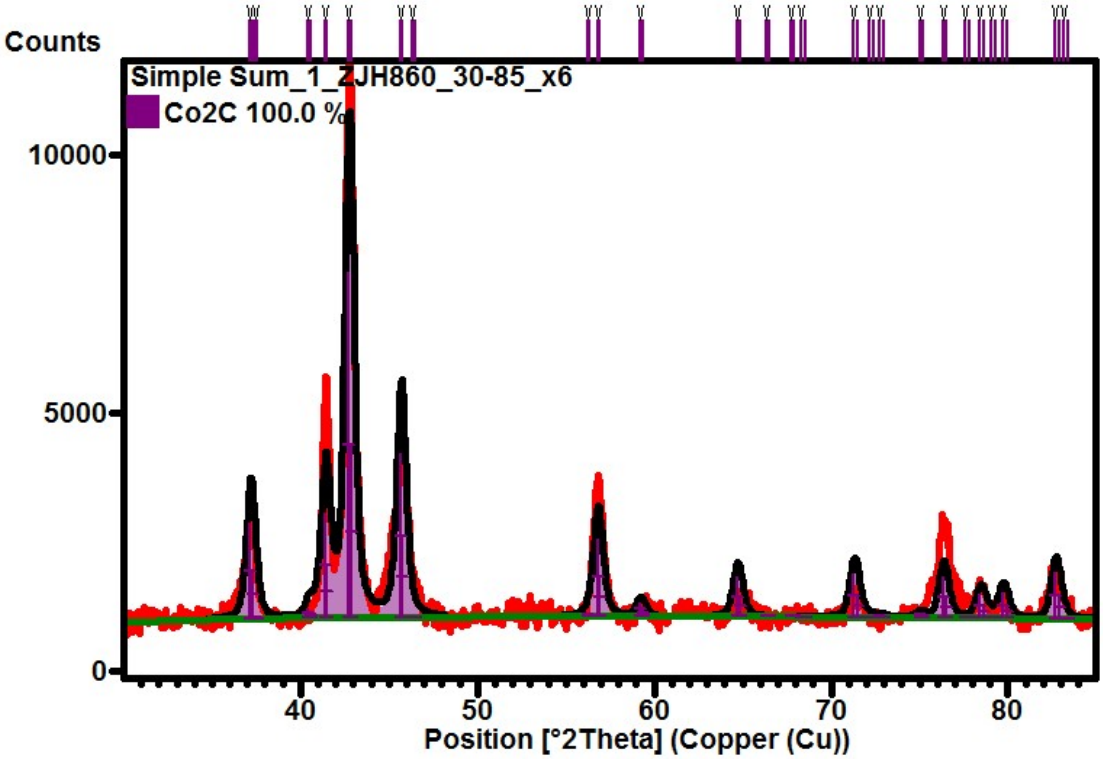

Counts
Simple Sum_1_ZJH818_30-85_x4_
CoO_ZB 5.7 %
Co2C 2.9 %
CoO_W 91.5 %
600
400
200
91.5 %
2.9 %
5.7 %
40
50
60
70
80
Position [°2Theta] (Copper (Cu))

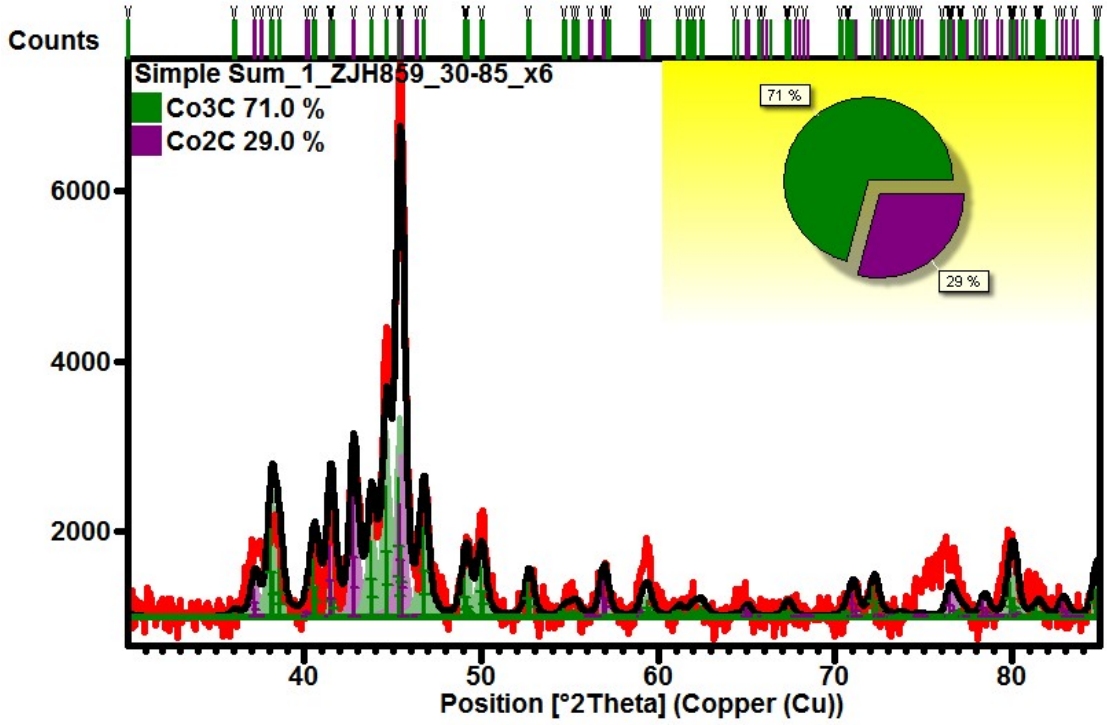

Counts
800
600
400
200
CoO_W 58.8 %
12.7 %
28.5 %
40
50
60
70
80
Position [°2Theta] (Copper (Cu))

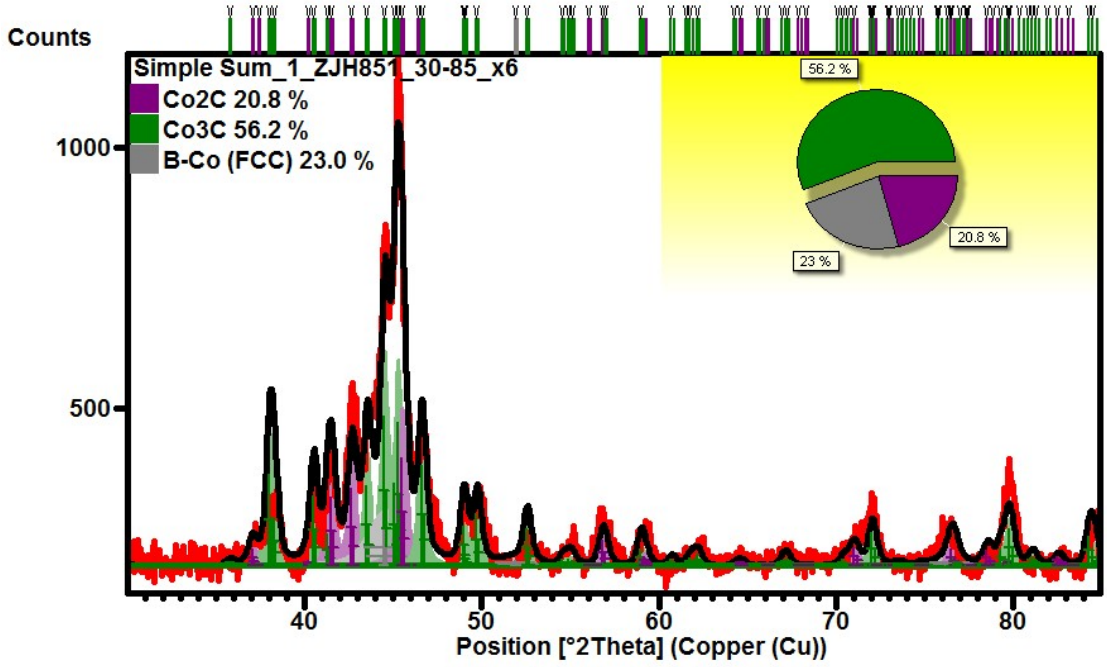


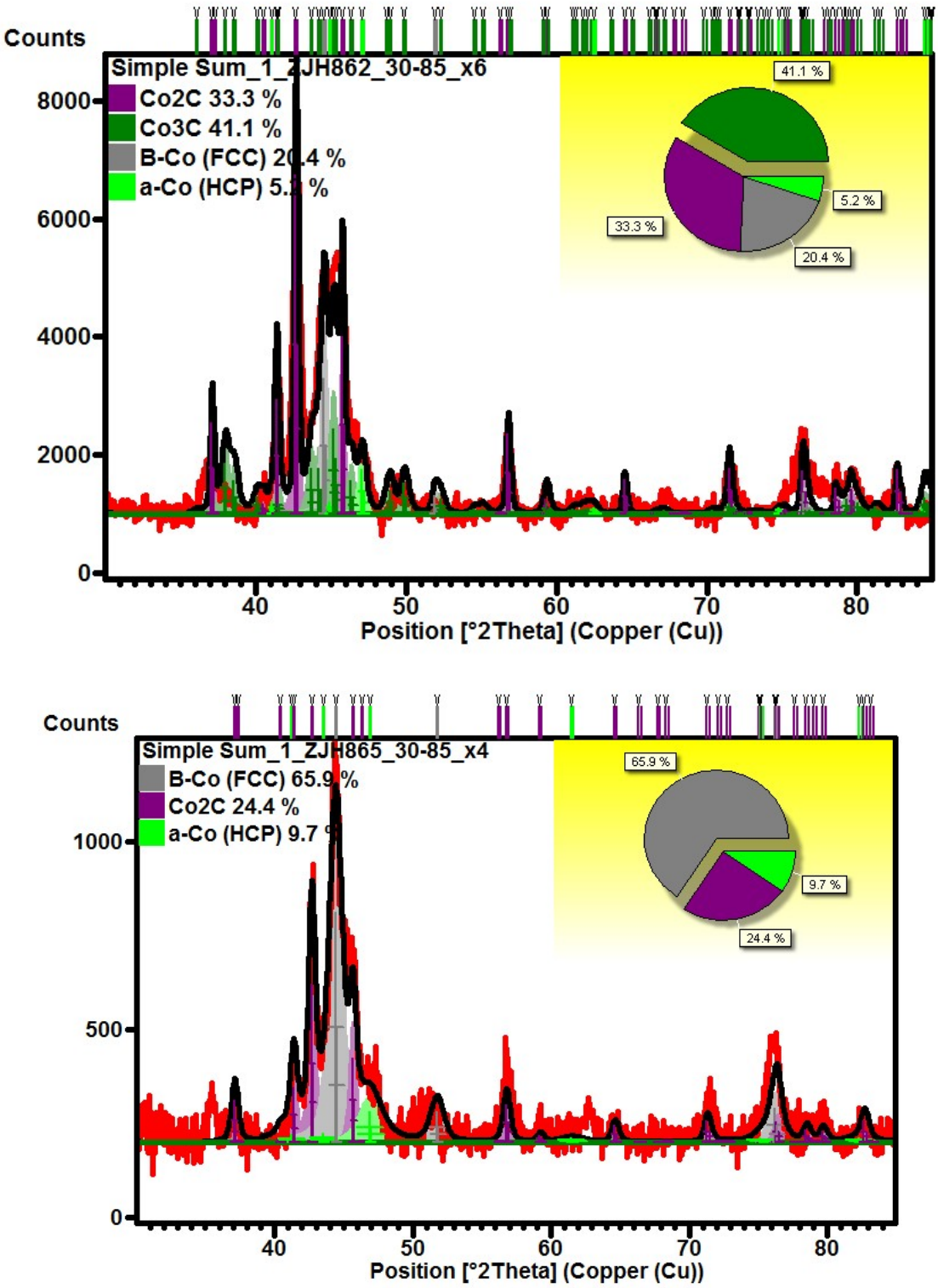
S1. XRD fits for particles synthesized in 10 mL of 4-EG and 12 mL of oleylamine. Samples start at a 15 min reaction time (top) and progress to 1 hour, 2 hours, and 4 hours (bottom)


Counts
Simple Sum_1_ZJH861_30-85_x6
Co2C 6.4 %
CoO_W 91.6 %
CoO_ZB 2.0 %
91.6 %
2 %
6.4 %
10000
5000
0
40
50
60
70
80
Position [°2Theta] (Copper (Cu))

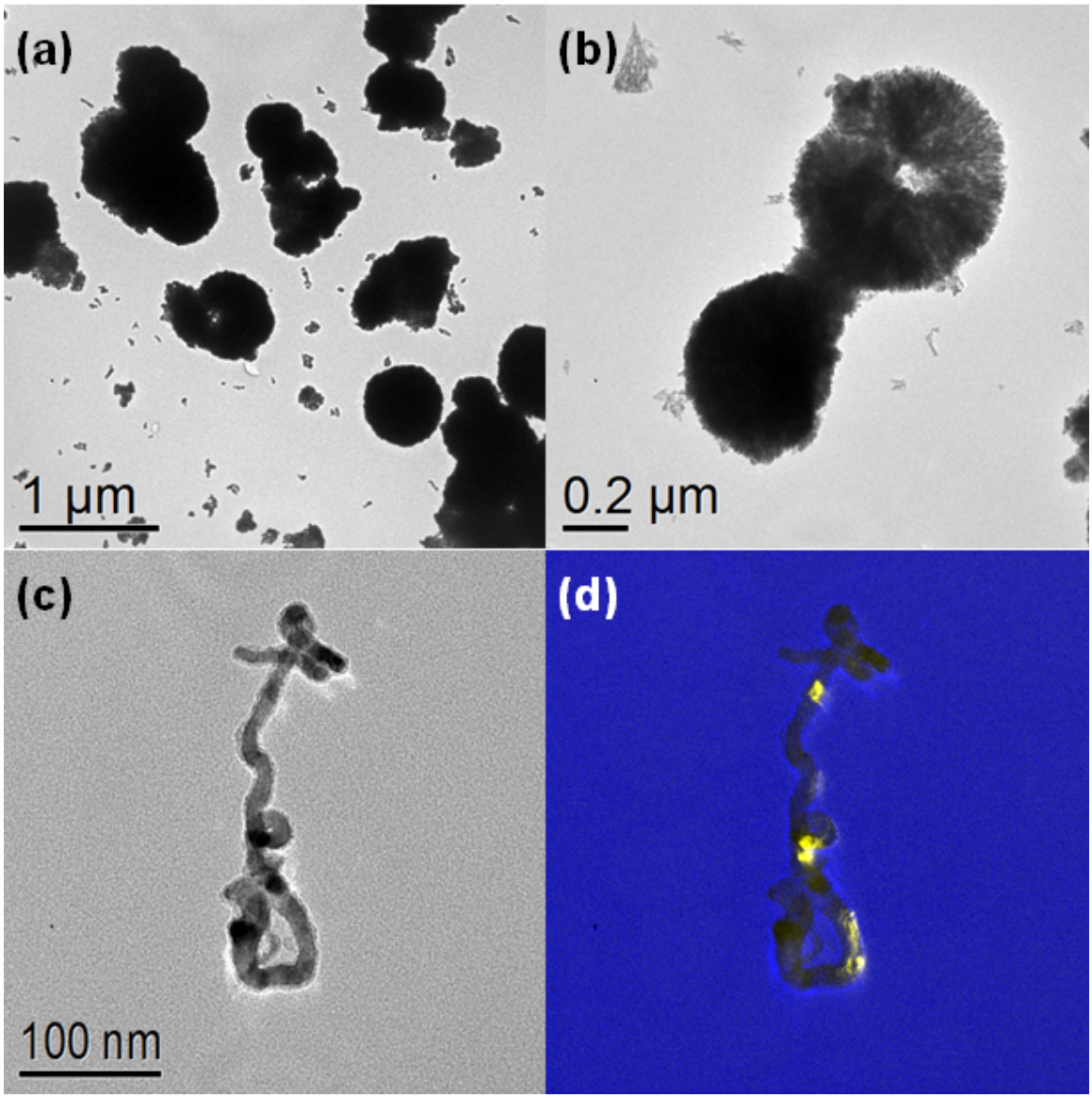

Counts
Simple Sum_1_ZJH860_30-85_x6
Co2C 100.0 %
10000
5000
0
40
50
60
70
80
Position [°2Theta] (Copper (Cu))


Counts
Simple Sum_1_ZJH859_30-85_x6
Co3C 71.0 %
Co2C 29.0 %
71 %
29 %
6000
4000
2000
40
50
60
70
80
Position [°2Theta] (Copper (Cu))

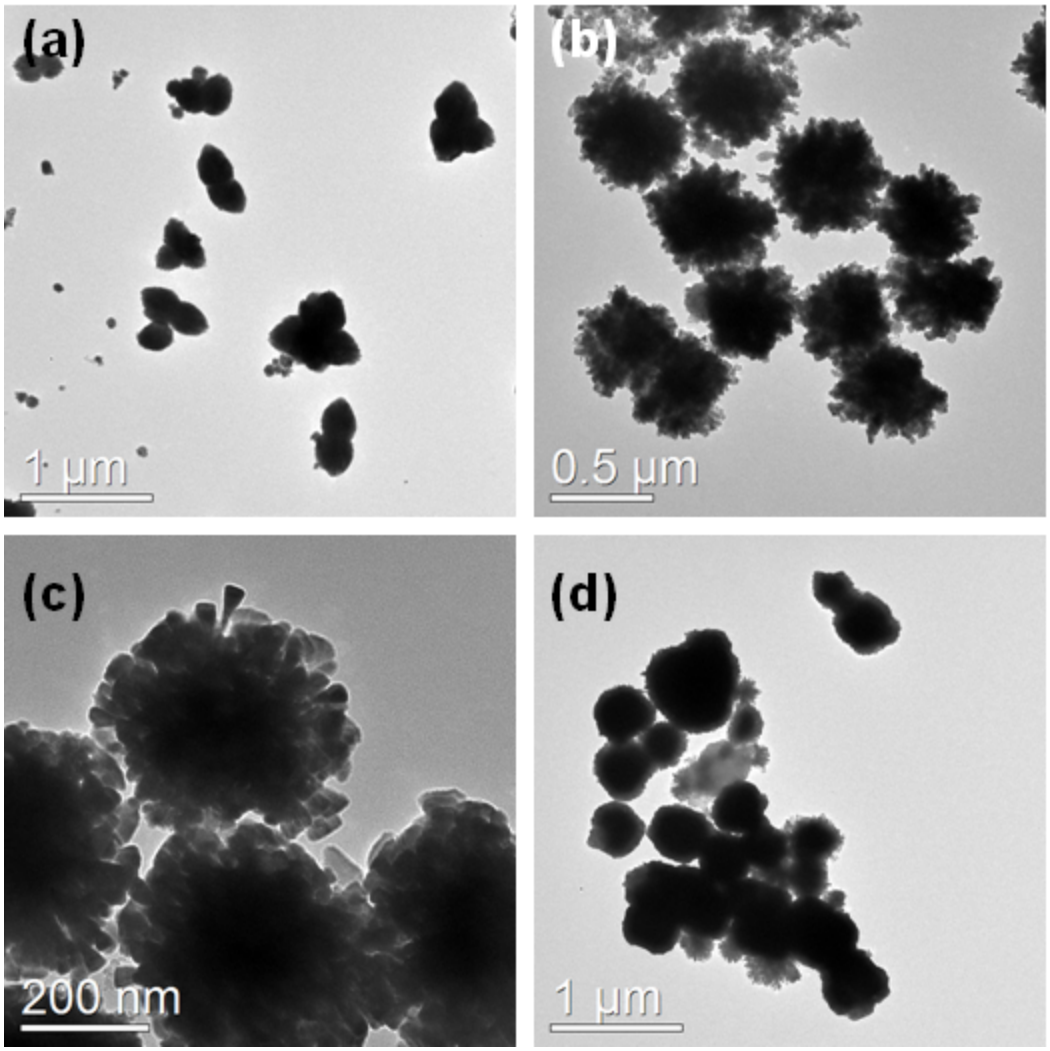

Counts
Simple Sum_1_ZJH851_30-85_x6
Co2C 20.8 %
Co3C 56.2 %
B-Co (FCC) 23.0 %
56.2 %
20.8 %
23 %
1000
500
40
50
60
70
80
Position [°2Theta] (Copper (Cu))



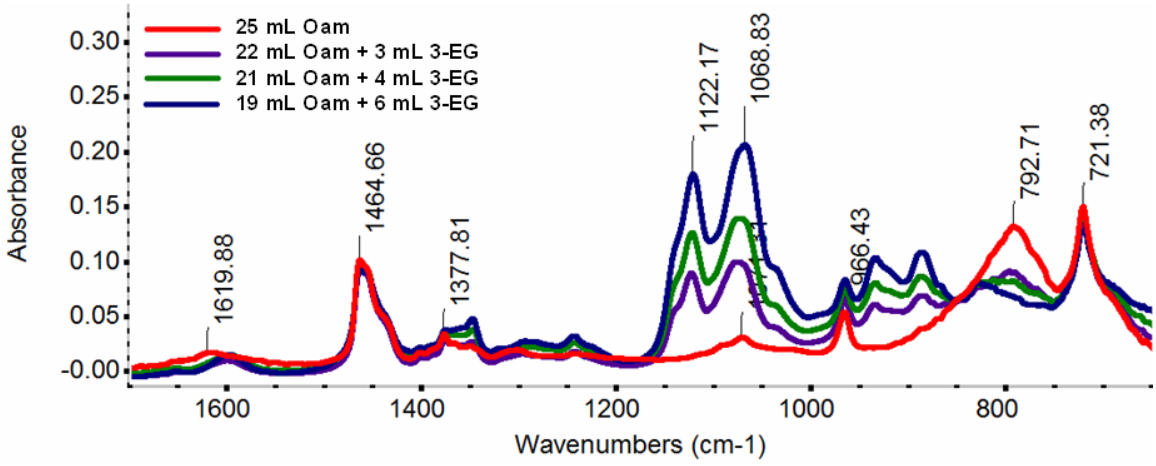
S2. XRD fits for particles synthesized using various amounts of 3-EG.. Samples start at a 2 mL 3-EG time (top) and progress to 3 mL, 4 mL, 5 mL, 6 mL and 7 mL (bottom).



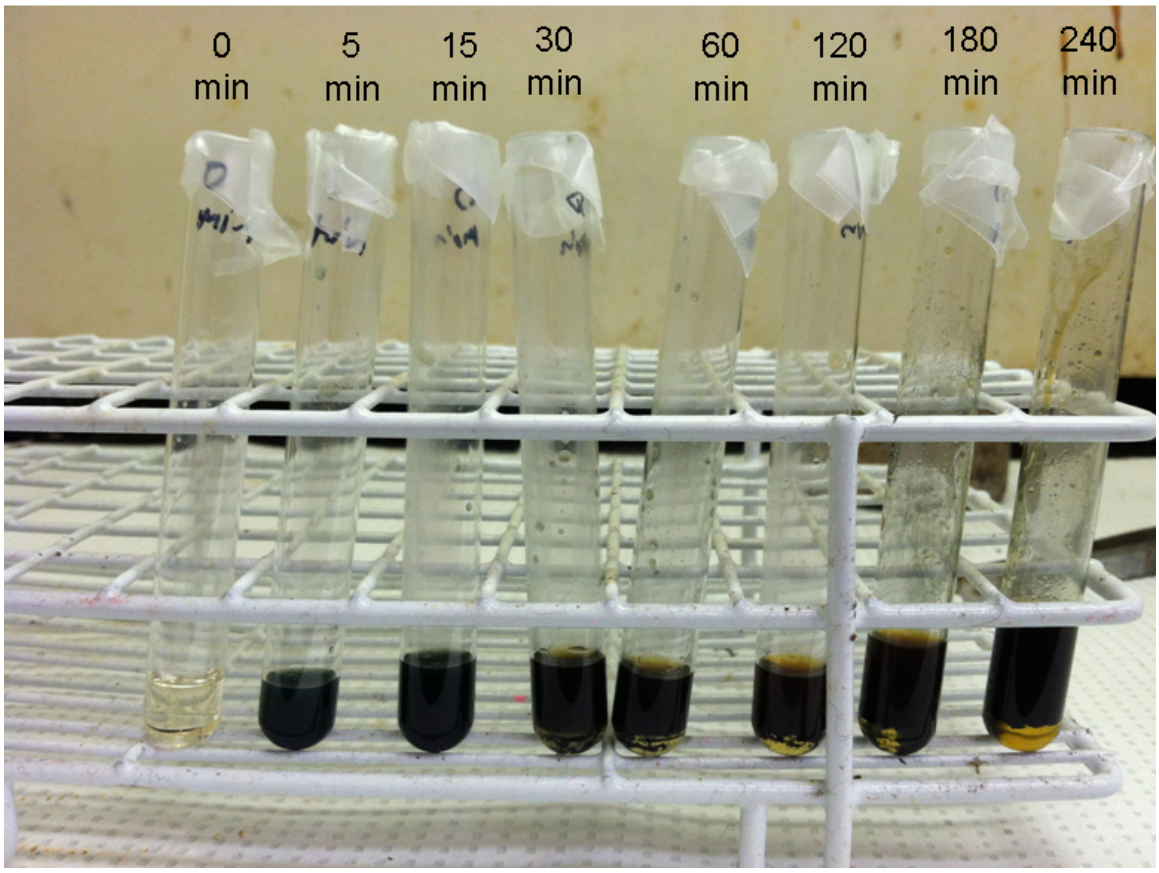
S3. (a,b) TEM images of large, densely agglomerated particles found after a 4 hour reaction. (c,d) Bright field and dark field images, displaying the presence of individual crystallites embedded in the carbon structures.



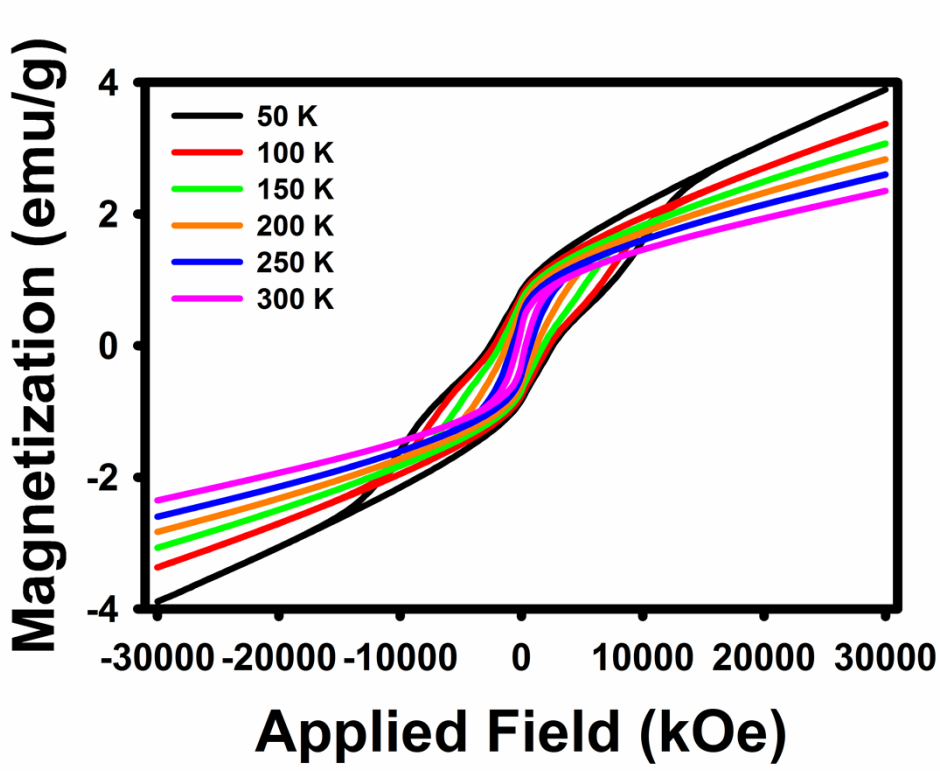
S4. TEM images of particles synthesized at various amounts of 3-EG: (a) 2 mL, (b) 3 mL, (c) 4 mL, and (d) 7 mL

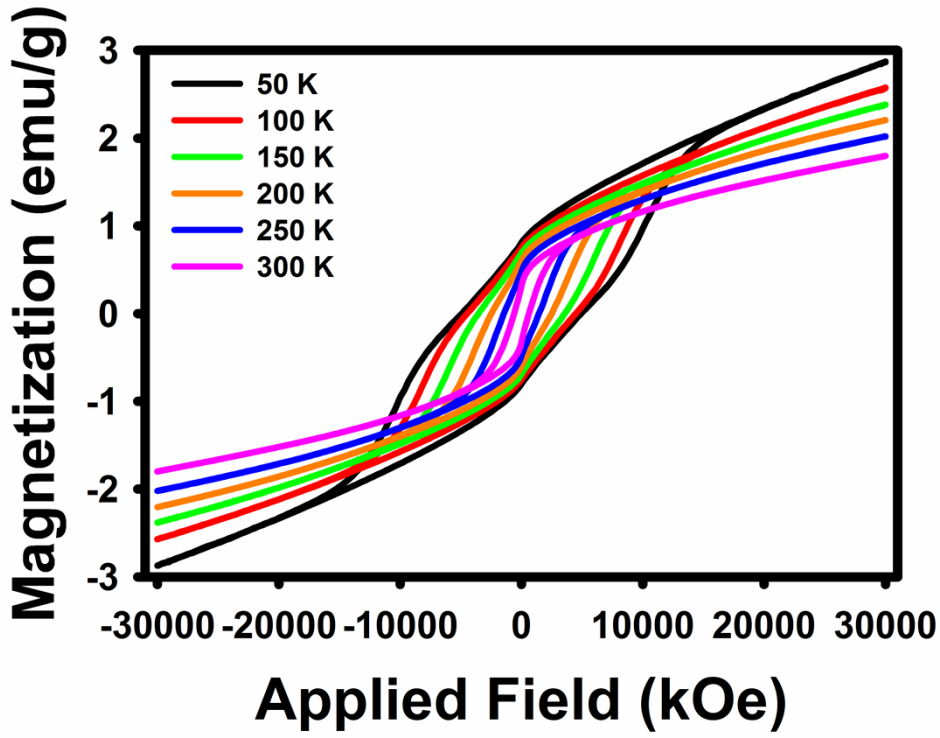


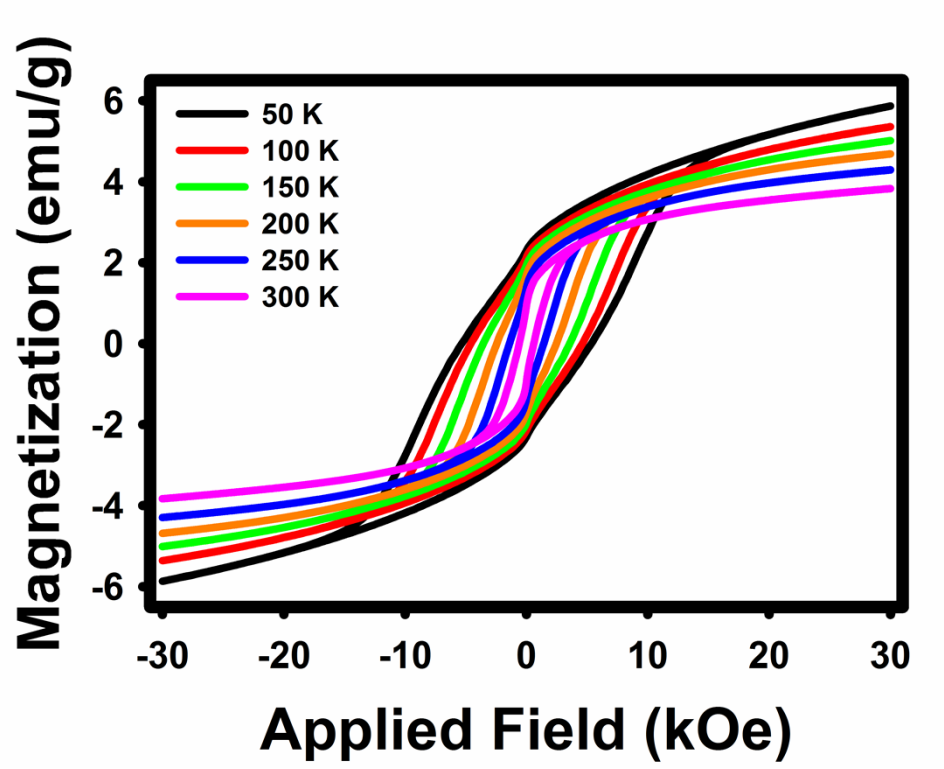
S5. FT-IR spectra of differing ratios of 3-EG to oleylamine, prior to the addition of cobalt precursor, with peaks labeled.



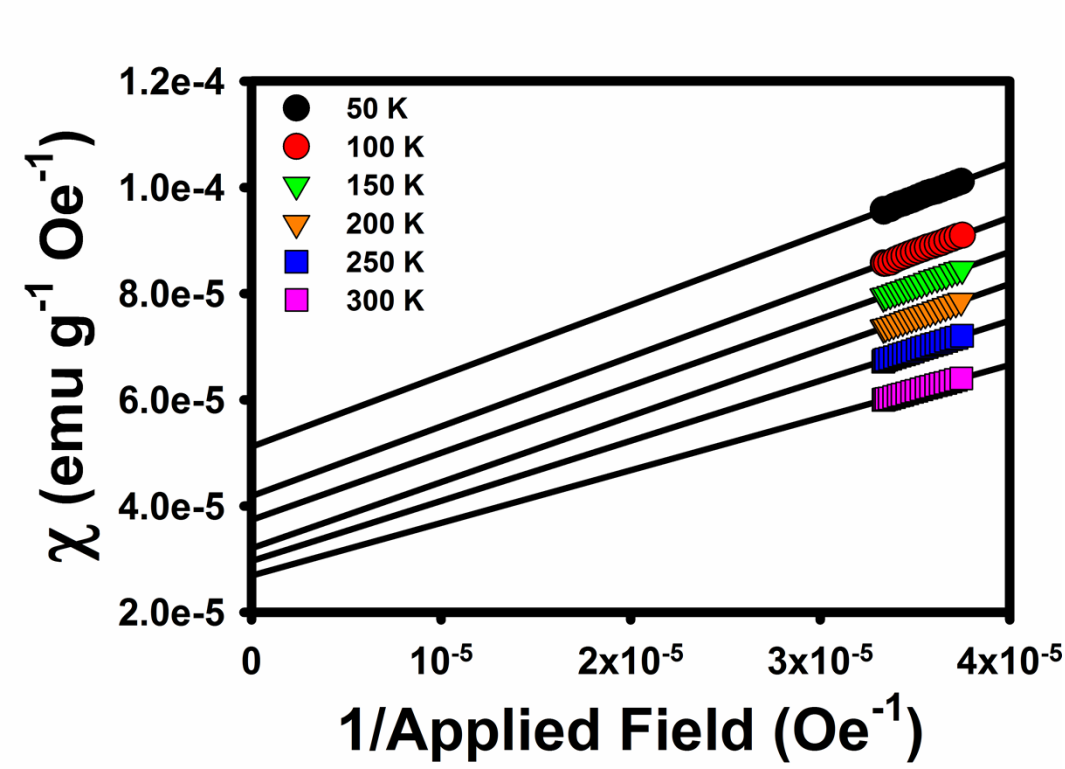
S6. Picture of aliquots taken from a single reaction at various times. Aliquots collected at times greater than 15 minutes, showed a two phase nature, with an organic phase on top and aqueous phase on the bottom.

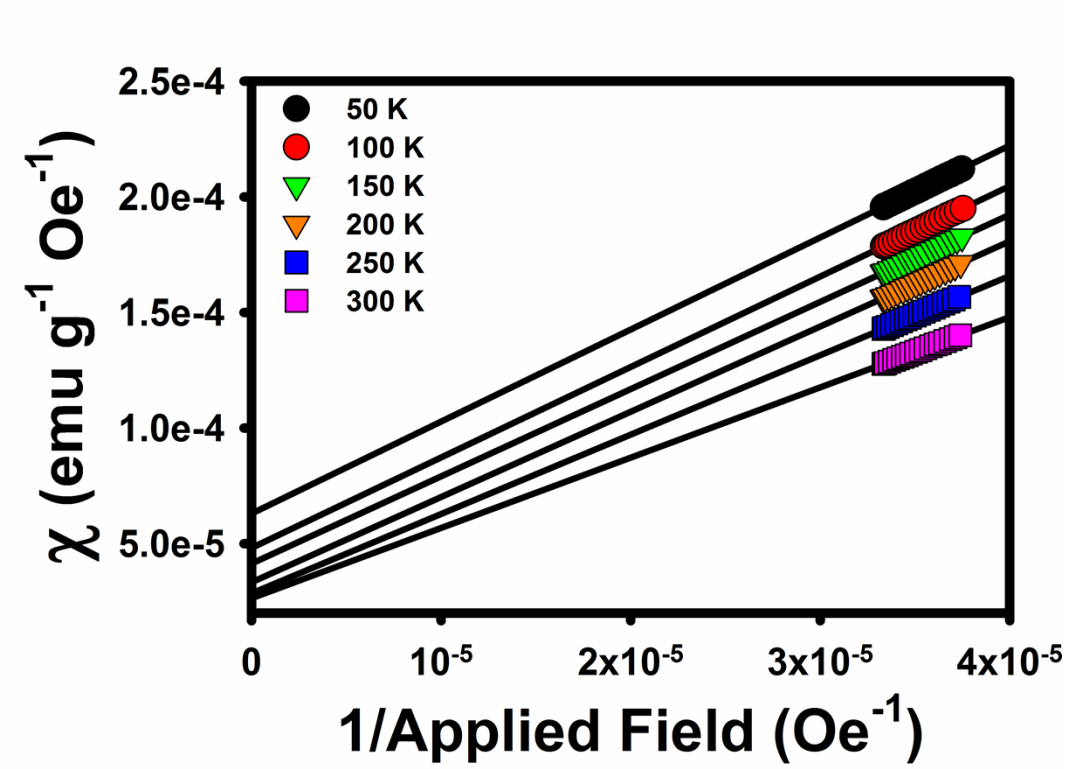

Magnetization (emu/g)
4
2
0
-2
-4
50 K
100 K
150 K
200 K
250 K
300 K
-30000 -20000 -10000 0 10000 20000 30000
Applied Field (kOe)


Magnetization (emu/g)
3
2
1
0
-1
-2
-3
50 K
100 K
150 K
200 K
250 K
300 K
-30000 -20000 -10000 0 10000 20000 30000
Applied Field (kOe)

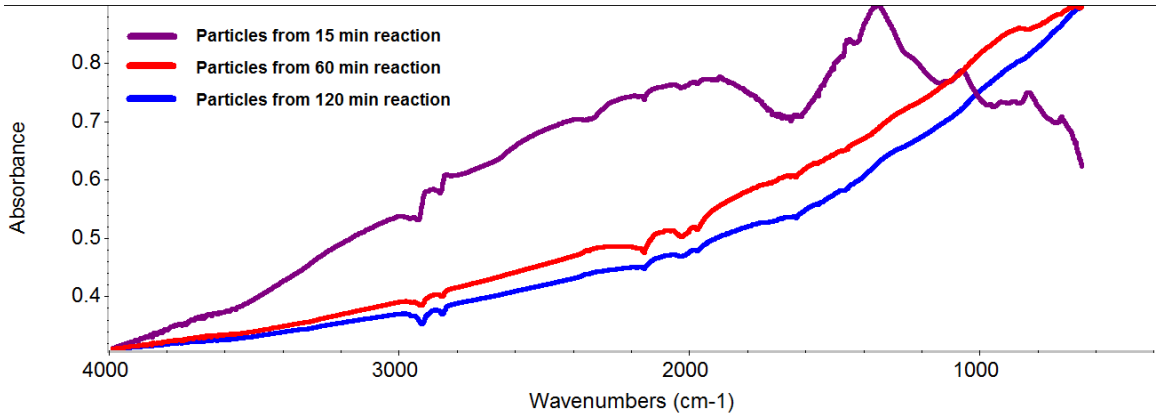


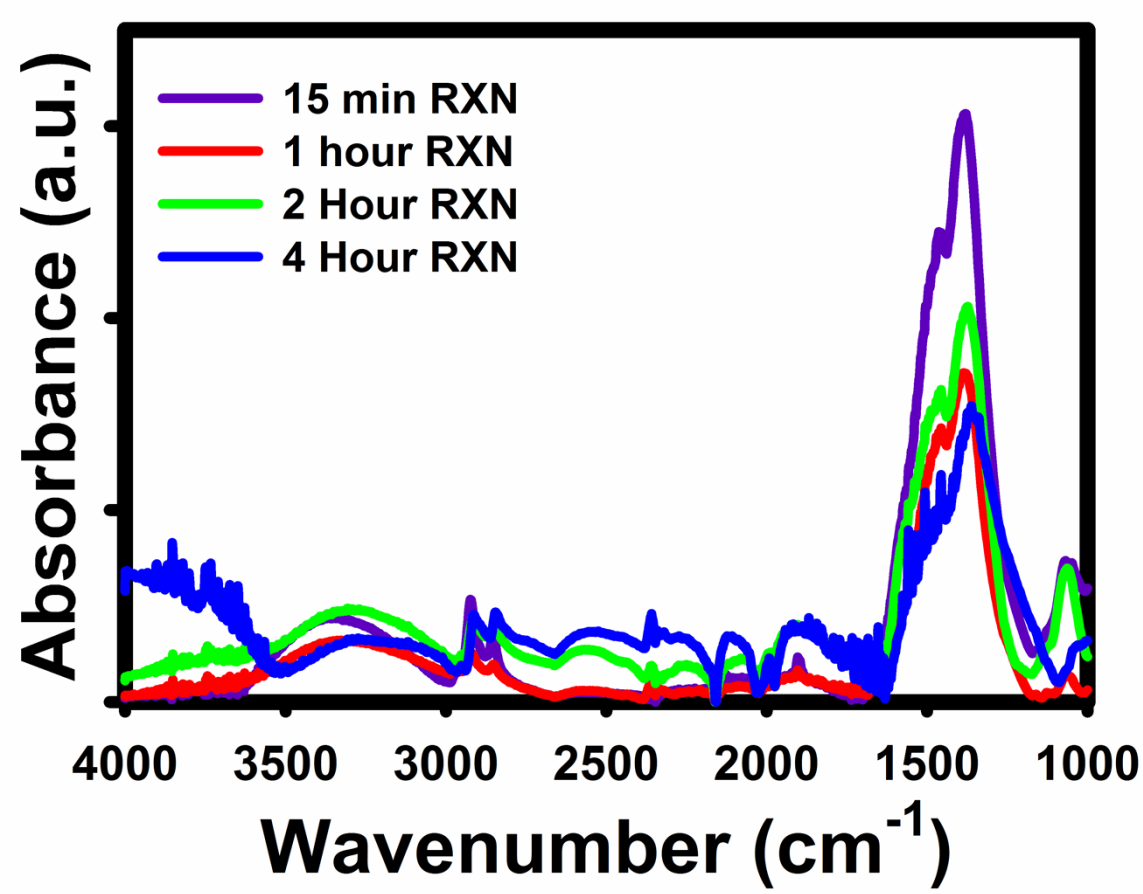
S7. M(H) curves for CoO/Co_2C samples synthesized in 10 mL 4-EG and 15 mL oleylamine for reaction times of 1 hour (top), 2 hours (middle), and 4 hours (bottom).



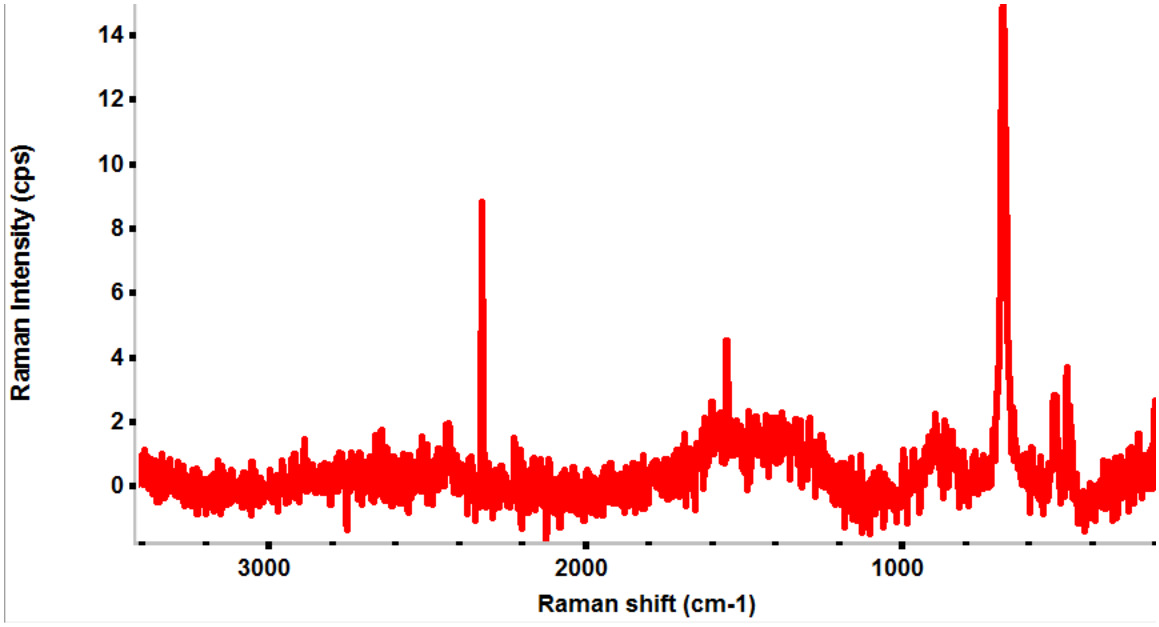


S7. Honda-Owens plots for CoO/Co_2C samples synthesized in 10 mL 4-EG and 15 mL oleylamine for reaction times of 2 hours (top), and 4 hours (bottom).

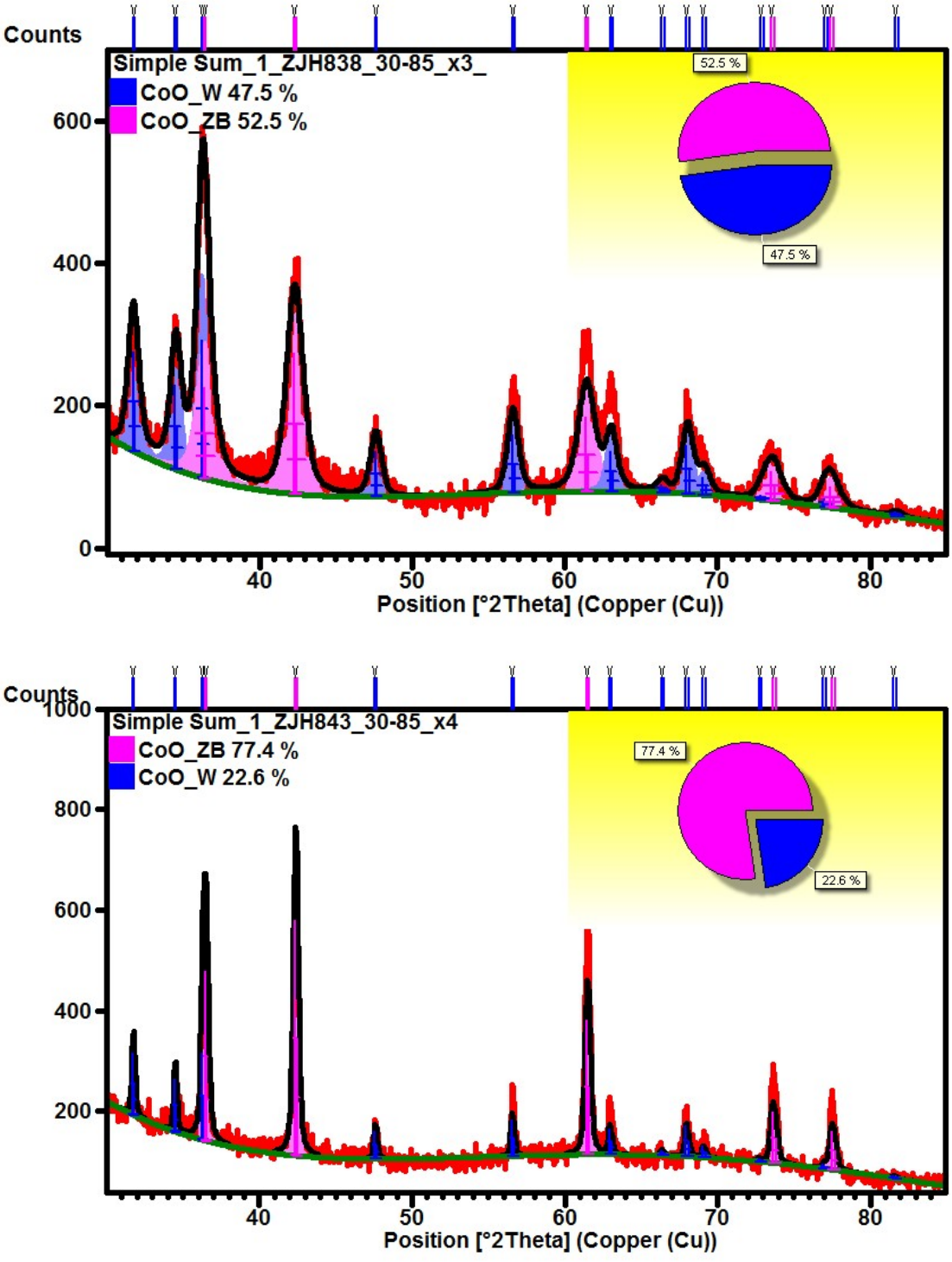




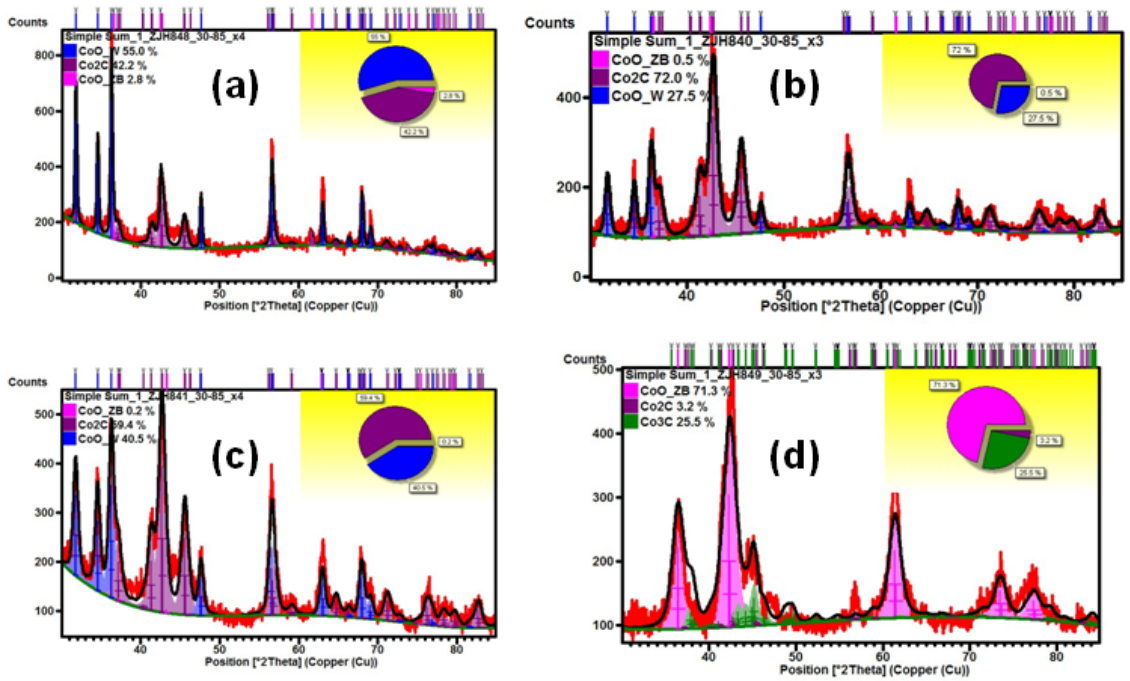
S8. FT-IR spectra of particles synthesized in 3-EG (top) and 4-EG (bottom) at various times



S9. Raman Spectra for particles showing 1-D structures in TEM images.



S10a. XRD patterns for samples prepared in just oleylamine at (top) 15 minute and (bottom) 2 hour reaction times



S10b. XRD Patterns for samples synthesized at various ratios of Oam to 4-EG (corresponds to data in Figure 1(c)): (a) 22.5:2.5, (b) 20:5, (c) 15:10, and (d) 5:20. Data for the 10:15 ratio can be seen in Figure S1. All reactions were conducted for 2 hours.