

Supporting Information

Synthesis and Magnetic Properties of Co-Sn-O Nanorings

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1. Experimental details

All the chemicals were analytic grade reagents without further purification. In a typical experimental procedure, designated amounts of $\text{Co}(\text{AC})_2 \cdot 4\text{H}_2\text{O}$ and $\text{SnCl}_4 \cdot 5\text{H}_2\text{O}$ were dissolved in 20 ml distilled water. After stirred for 20 minutes, a clear solution was obtained. 0.3 M NaOH was employed to adjust the pH to about 12, and then the solution was removed to a 100 ml Teflon-lined autoclave. The autoclave was filled up to 70% of its volume, sealed and heated at 220 °C for 22 h. After natural cooling, the resulted product was separated by centrifugation, washed several times with distilled water and ethanol, and dried at 60 °C for 4 h.

The morphology and microstructure of the synthesized products were characterized by XRD (Model D/MAX-RB, Rigaku), SEM (JSM-6700F, JOEL), TEM, EDX and SAED (JEM-2100F, JEOL). RT Magnetic Hysteresis Loops were measured with physical properties measurement system (PPMS-9, Quantum Design). Pore distribution was analyzed on Macromeritics ASAP 2010.

2. TEM images of the as-prepared samples with different cobalt contents

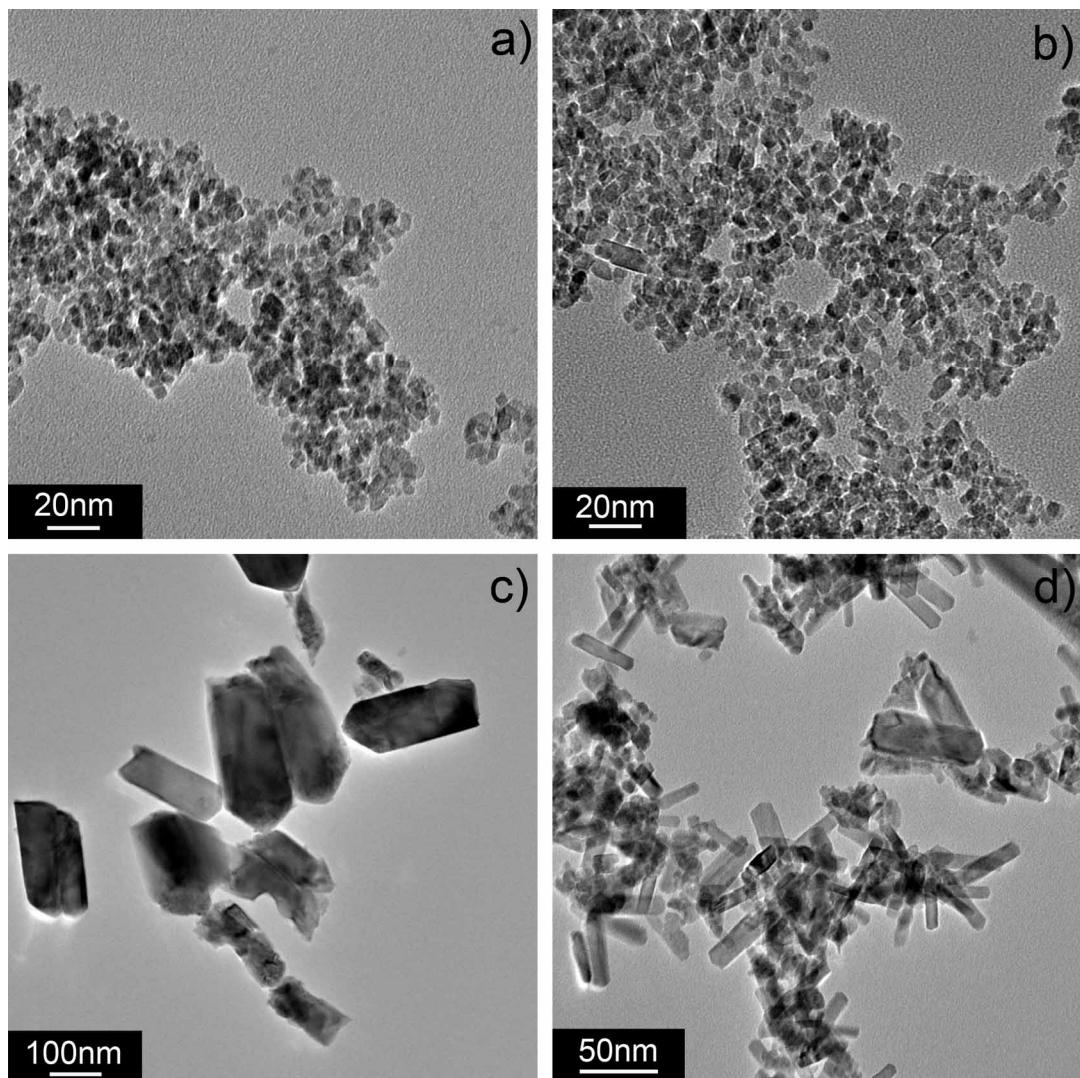


Fig.S1. TEM images of the samples with a) 0, b) 5, c) 10, d) 20 cobalt at.%.

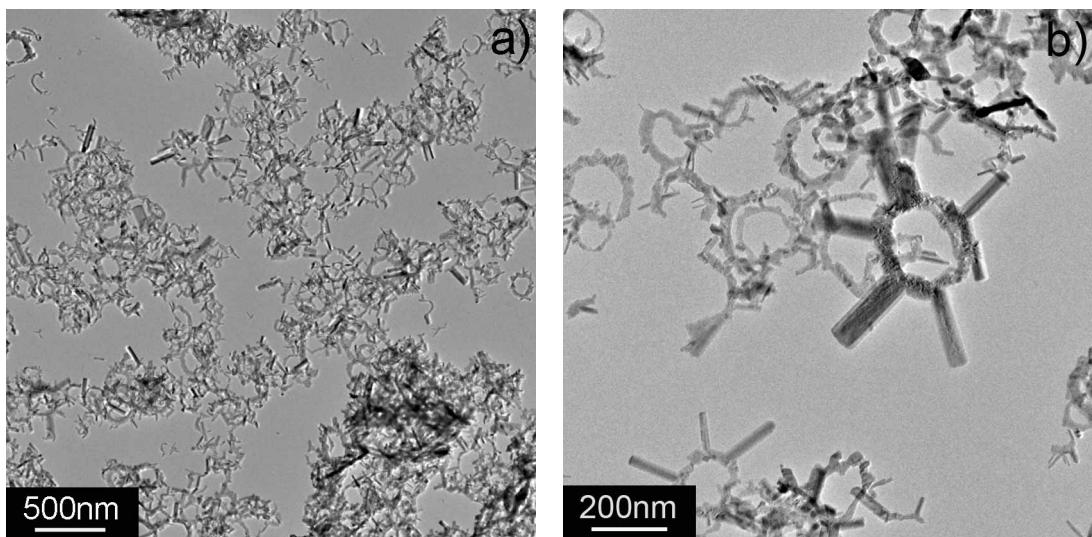


Fig.S2. a) Low-magnitude TEM image of the sample with 50 cobalt at.%; b) Enlarged images.

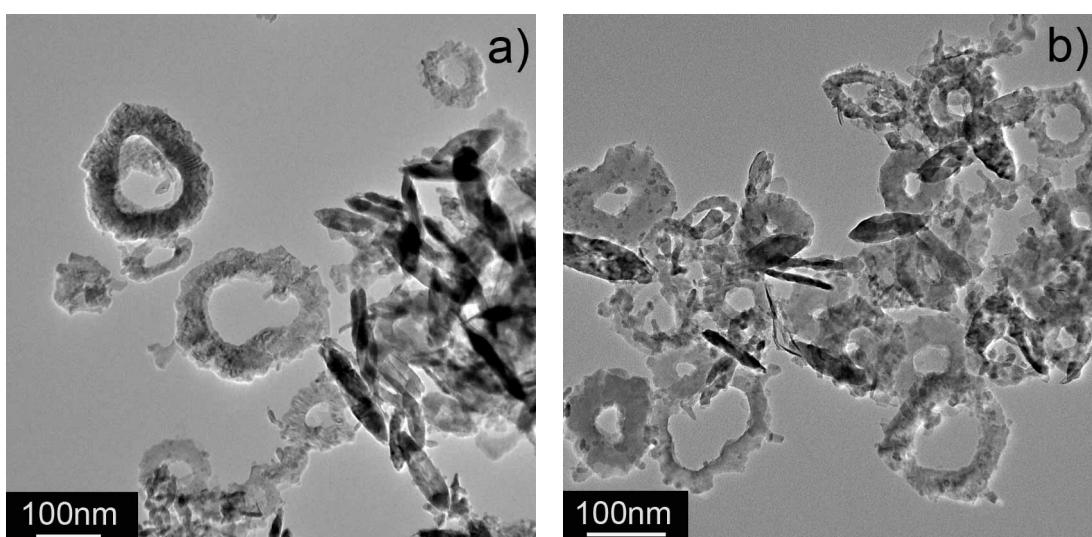


Fig. S3. TEM images of the sample with 70 cobalt at.%.

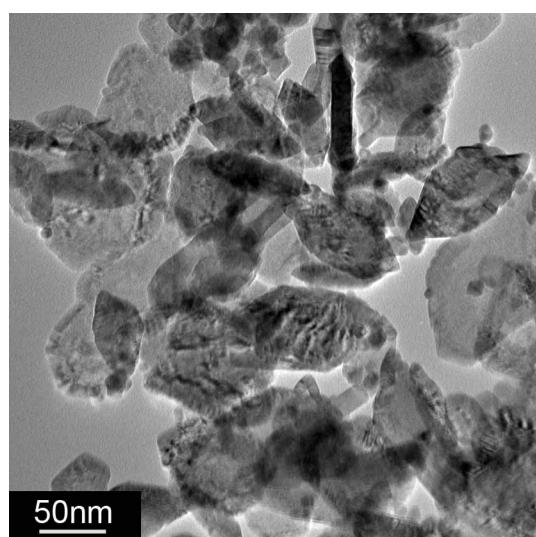


Fig. S4. TEM image of the sample with 80 cobalt at.%

3. Magnetic hysteresis loops of samples with different cobalt content

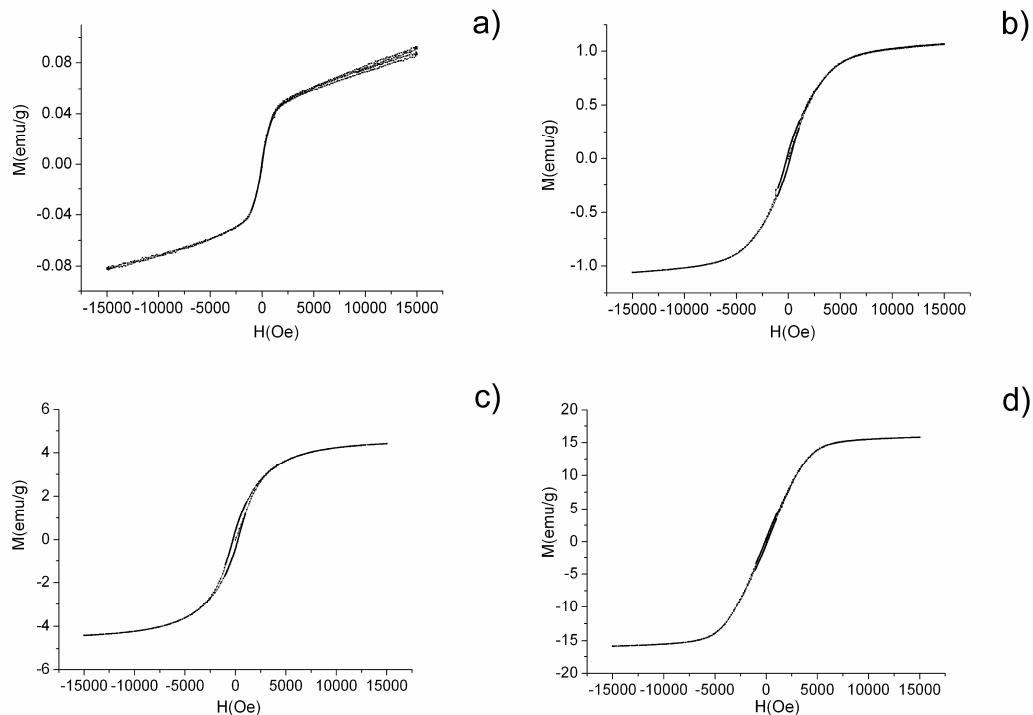


Fig. S5. Magnetic hysteresis loops of samples with different cobalt content: a) 5, b) 10, c) 20, d) 50 at. %.

4. EDX analysis of the rings with spokewise rods (50 cobalt at.%)

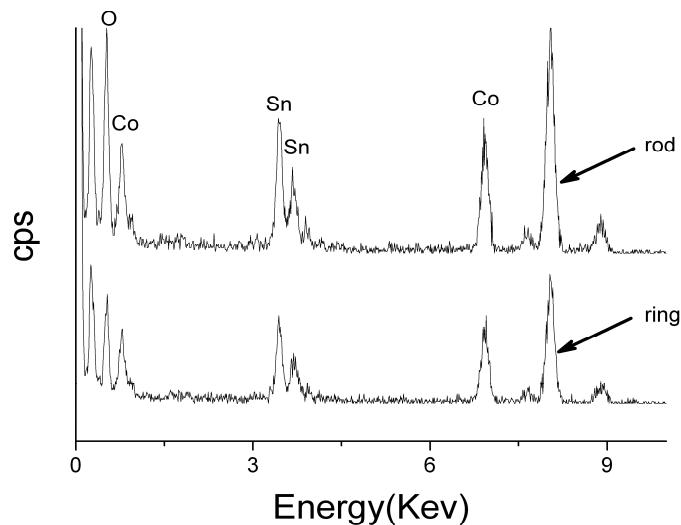


Fig. S6. EDX spectrum of the sample with 50 cobalt at.%

	Co (%)	Sn (%)	Co/Sn
rod	32.02	21.56	1.49
ring	36.69	22.39	1.63

Table S1. Atomic% of Co and Sn in different districts

5. Pore distribution of Co-Sn-O nanorings (70 cobalt at.%)

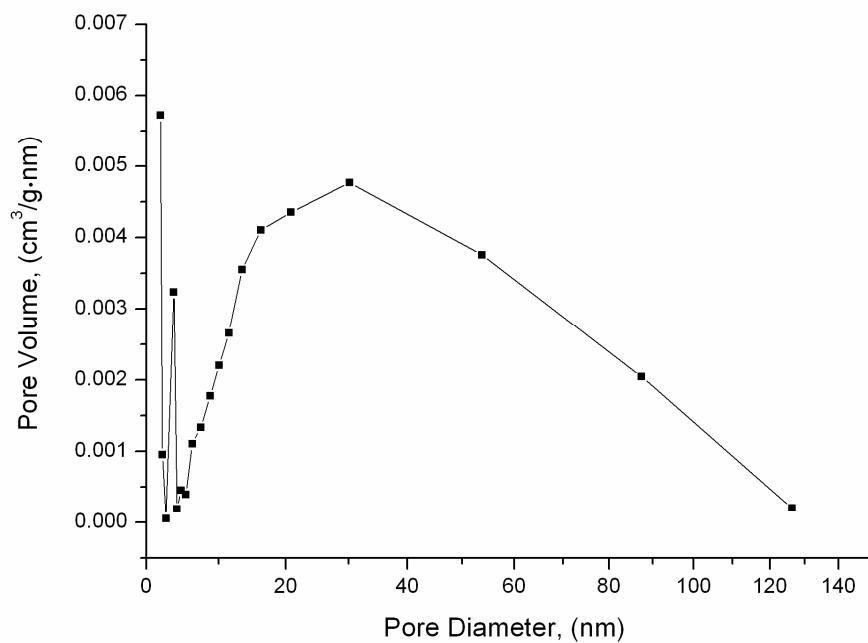


Fig. S7. Pore distribution of the sample with 70 cobalt at.%.