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 Co(AC)_2•4H_2O and SnCl_2•5H_2O 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.%

<table>
<thead>
<tr>
<th></th>
<th>Co (%)</th>
<th>Sn (%)</th>
<th>Co/Sn</th>
</tr>
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<tbody>
<tr>
<td>rod</td>
<td>32.02</td>
<td>21.56</td>
<td>1.49</td>
</tr>
<tr>
<td>ring</td>
<td>36.69</td>
<td>22.39</td>
<td>1.63</td>
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</tbody>
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Table S1. Atomic% of Co and Sn in different districts
5. Pore distribution of Co-Sn-O nanorings (70 cobalt at.\%)