Remarkable Annealing Time Effect on Magnetic Properties of Single Source Coordination Polymer Precursor derived CoFe$_2$O$_4$ Nanoparticles

Debamalya Ghosh$^{1,3}$, Debal Kanti Singha$^{1,2}$, Oleg I. Lebedev$^3$, Md. Motin Seikh$^{2,*}$ and Partha Mahata$^{1,*}$

$^1$Department of Chemistry, Jadavpur University, Kolkata 700032, India
$^2$Department of Chemistry, Visva-Bharati University, Santiniketan, 731235
$^3$Laboratoire CRISMAT, ENSICAEN UMR6508, 6 Bd Maréchal Juin, Cedex 4, Caen-14050, France

ELECTRONIC SUPPLEMENTARY INFORMATION
Table S1: The observed IR bands for \((\text{H}_2\text{pip})[\text{Co}_{1/3}\text{Fe}_{2/3}(\text{pydc-2,5})_2(\text{H}_2\text{O})] \cdot 2\text{H}_2\text{O}]\), 1.

<table>
<thead>
<tr>
<th>Bands</th>
<th>Wavenumber (cm(^{-1}))</th>
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<th>Wavenumber (cm(^{-1}))</th>
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<tbody>
<tr>
<td>(\nu_{\text{str}}(\text{H}_2\text{O}))</td>
<td>3400-3000(s)</td>
<td>(\nu_{\text{str}}(\text{C}-\text{N}))</td>
<td>1354(s), 1337(s), 1315(m), 1283(w), 1254 (w), 1233 (w)</td>
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<tr>
<td>(\nu_{\text{asf}}(\text{aromatic C-H}))</td>
<td>3014(w)</td>
<td>(\delta(\text{aromatic C-H})) (_{\text{in plane bending}})</td>
<td>1201(w), 1169(m), 1140(w), 1119 (w), 1092(m), 1033(s), 1012(w), 983(w)</td>
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<tr>
<td>(\nu_{\text{asy.asf}}(5\text{p}_{3}\text{C-H}))</td>
<td>2819(w), 2760(w) 2730(w), 2598 (w)</td>
<td>(\delta(\text{aromatic C-H})) (_{\text{out of plane bending}})</td>
<td>879(w), 865 (w), 758(m), 737(m), 669(w), 658(w), 593 (w)</td>
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<tr>
<td>(\nu_{\text{asy.asf(carboxylate)}})</td>
<td>1653(s)</td>
<td>(\delta(\text{N-H})) (_{\text{out of plane bending}})</td>
<td>833(s)</td>
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<td>(\nu_{\text{asf}}(\text{aromatic C=C}))</td>
<td>1600 (s), 1580(s), 1558(s), 1540(m), 1522 (w), 1458 (m)</td>
<td>(\delta(\text{carboxylate})) (_{\text{bending}})</td>
<td>690(m)</td>
</tr>
<tr>
<td>(\delta(\text{H}<em>2\text{O})) (</em>{\text{bending}})</td>
<td>1592(s),</td>
<td></td>
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<tr>
<td>(\nu_{\text{asy.suf(carboxylate)}})</td>
<td>1403 (s)</td>
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Figure S1: Powder XRD (CuKα) patterns: (a) simulated from single crystal X-ray data of \{(H₂pip)[Fe(pydc-2,5)₂(H₂O)]·2H₂O\} where H₂pip = piperazinium, pydc-2,5 = pyridine-2,5-dicarboxylate, 1a, (b) experimental PXRD of 1a, and (c) experimental PXRD of \{(H₂pip)[Co₁/₃Fe₂/₃(pydc-2,5)₂(H₂O)]·2H₂O\}, 1.
Figure S2: IR spectrum of \( \{(\text{H}_2\text{pip})\text{Co}_{1/3}\text{Fe}_{2/3}(\text{pydc-2,5})_2(\text{H}_2\text{O})\}_2\text{H}_2\text{O}, 1. \)
Figure S3: SEM image of \{(H_2\text{pip})[Co_{1/3}Fe_{2/3}(pydc-2,5)_2(H_2O)]\cdot2H_2O\}, I.
Figure S4: Thermogravimetric analysis (TGA) of \{(\text{H}_2\text{pip})[\text{Co}_{1/3}\text{Fe}_{2/3}(\text{pydc-2,5})_2(\text{H}_2\text{O})]·2\text{H}_2\text{O}\}, 1, in nitrogen atmosphere.
Figure S5: Schematic representation of the formation of CoFe$_2$O$_4$. 
Figure S6: SEM images of CoFe$_2$O$_4$. Note the size of the particles in nano-regime.
Figure S7: SEM images of CoFe$_2$O$_4$. Note the size of the particles in nano-regime.