Electronic supporting information

Substrate-induced Hydrothermal Synthesis of Hematite

Superstructure and Their Fischer-Tropsch synthesis Performance

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Fig. S1 FESEM images of (a) the original 5ppi Fe foam substrate (b) the corresponding uniform growth layer of $\alpha$-Fe$_2$O$_3$, (c) the original 20ppi Fe foam substrate (d) the corresponding uniform growth layer of $\alpha$-Fe$_2$O$_3$, (e) the original 100ppi Fe foam substrate (f) the corresponding uniform growth layer of $\alpha$-Fe$_2$O$_3$, (g) the original iron wire with a diameter of 200 $\mu$m (h) the corresponding uniform growth layer of $\alpha$-Fe$_2$O$_3$. The inserted represent the optical images of various substrates. (i) the optical image of growth layer of $\alpha$-Fe$_2$O$_3$ (j) FESEM image of growth layer of $\alpha$-Fe$_2$O$_3$.

Fig. S2 The powder in the autoclave which did not grow on the 100ppi Fe foam substrate: (a) 100ppi-Fe$^{2+}$, (b) 100ppi-Fe$^{3+}$. 
Fig. S3 XRD patterns of the powder catalysts prepared by FeCl$_2$·4H$_2$O and FeCl$_3$·6H$_2$O in the absence of Fe foam substrate.

Fig. S4 XRD pattern of 100ppi-Fe$^{2+}$ catalyst after reaction of 12 h.

<table>
<thead>
<tr>
<th>Sample</th>
<th>5ppi-Fe$^{2+}$</th>
<th>5ppi-Fe$^{3+}$</th>
<th>20ppi-Fe$^{2+}$</th>
<th>20ppi-Fe$^{3+}$</th>
<th>100ppi-Fe$^{2+}$</th>
<th>100ppi-Fe$^{3+}$</th>
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<tbody>
<tr>
<td>Fe$^{2+}$ (ORT)</td>
<td>21.2</td>
<td>6.3</td>
<td>20.7</td>
<td>6.8</td>
<td>21.3</td>
<td>7.3</td>
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