Supporting Information

Novel MOF-derived 3D hierarchical needlelike array architecture with excellent EMI shielding, thermal insulation and supercapacitor performance †

Si-Qi Zhu,‡ Jin-Cheng Shu,‡ Mao-Sheng Cao*

School of Materials Science and Engineering, Beijing Institute of Technology, Beijing 100081, China

*Corresponding author. E-mail: caomaosheng@bit.edu.cn

† Electronic supplementary information (ESI) available.

‡ These authors contributed equally to this work.
Fig. S1. XRD patterns of (a) ZIF-67 and (b) Co$_3$O$_4$/C.
Fig. S2. (a) $\text{SE}_T$, (b) $\text{SE}_A$, (c) $\text{SE}_R$, (d) $A$, (e) $R$ and (f) $T$ of the NF@Co/C architectures with different pyrolysis temperatures.
Fig. S3. $SE_T$, $SE_A$ and $SE_R$ of Ni foam in X band.
Fig. S4. The plots of (a) complex permittivity, (b) Cole-Cole plots, (c) $\mu''(\mu')^{-2}f^{-1}$ and (d) complex permeability for the NF@Co/C-550 sample.
Fig. S5. CV curves of the NF@Co/C architectures with different pyrolysis temperatures.
Fig. S6. Capacitive contributions at (a) 5 mV s⁻¹, (b) 10 mV s⁻¹, (c) 20 mV s⁻¹, (d) 30 mV s⁻¹, (e) 50 mV s⁻¹ and (f) 100 mV s⁻¹.
Fig. S7. Non-faradaic current density obtained from the CV curves at 0.1 V as a function of scan rate.
Table S1 The equivalent circuit parameters of NF@Co/C-550 electrode.

<table>
<thead>
<tr>
<th>Sample</th>
<th>$R_1$ (Ω)</th>
<th>$R_2$ (Ω)</th>
<th>CPE1 (mF)</th>
<th>W1</th>
</tr>
</thead>
<tbody>
<tr>
<td>NF@Co/C-550</td>
<td>0.45</td>
<td>0.3882</td>
<td>9.17</td>
<td>0.01337</td>
</tr>
</tbody>
</table>

Fig. S8. Nyquist plots of NF@Co/C-550 sample before and after 10000 cycles.