Supporting Information

Dynamic Chitosan-Based Self-Healing Hydrogels with Tunable Morphology and Its application as an Isolating Agent

Santu Maity,\textsuperscript{a} Arpita Datta,\textsuperscript{b,c} Susanta Lahiri\textsuperscript{b} and Jhuma Ganguly\textsuperscript{a}\textsuperscript{*}

\textsuperscript{a}Department of Chemistry, Indian Institute of Engineering Science and Technology, Shibpur, Howrah-711103, India.

\textsuperscript{b}Chemical Sciences Division, Saha Institute of Nuclear Physics, 1/AF Bidhannagar, Kolkata-700064, India.

\textsuperscript{c}Amity Institute of Nuclear Science and Technology, Amity University, Sec-125, Noida, UP, India

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figures.png}
\caption{FT–IR spectra of (a) chitosan and (b) ChF.}
\end{figure}
Table S1: The most significant peak of FT-IR

<table>
<thead>
<tr>
<th>Sample</th>
<th>$\nu_{C=O}$ (amide I)</th>
<th>$\delta_{N-H}$ (amide II)</th>
<th>$\nu_{C=N}$ (imine)</th>
<th>$\nu_{(\text{bridge \ C-O-C})}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chitosan</td>
<td>1651.54</td>
<td>1553.40</td>
<td>absent</td>
<td>1072.10</td>
</tr>
<tr>
<td>ChG</td>
<td>absent</td>
<td>absent</td>
<td>1636.3</td>
<td>1073.3</td>
</tr>
</tbody>
</table>

Figure S2: $^{13}$C CP-MAS NMR spectrum ChF.

Table S2: Chemical shifts of ChF by $^{13}$C CP-MAS NMR

<table>
<thead>
<tr>
<th>C$_{1}$</th>
<th>C$_{1}'$</th>
<th>C$_{2}$</th>
<th>C$_{3}$</th>
<th>C$_{4}$</th>
<th>C$_{5}$</th>
<th>C$_{6}$</th>
<th>C$_{7}$</th>
<th>C$_{8}$</th>
<th>C$_{9}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>104.21</td>
<td>99.68</td>
<td>81.05</td>
<td>75.29</td>
<td>64.12</td>
<td>74.57</td>
<td>60.82</td>
<td>161.19</td>
<td>173.93</td>
<td>24.49</td>
</tr>
</tbody>
</table>
Figure S3: (a) and (b) are SEM images of ChF1 and ChF5 respectively, (c), (d), (e) and (f) AFM images of ChF1.
Figure S4: (a) Thermogravimetric analysis (b) Differential Scanning Calorimetry of ChF.

Figure S5: Powder XRD patterns of ChF.
Figure S6: SLX profile of $^{152}$Eu and $^{137}$Cs in solid phase (hydrogel) by varying (a) shaking time and (b) settling of the medium.

Figure S7: Morphological Study of ChF after heating at (a) 60 °C, (b) 75 °C and (c) 90 °C.

Figure S8: Effect of $\gamma$-irradiate ChF on the SLX profile of $^{152}$Eu and $^{137}$Cs in solid phase (ChF) at pH 5.
Figure S9: Appearance of self-healing of ChF hydrogel automatically without any additional stimuli.