Supporting Information

A novel high-strength photoluminescent hydrogel for tissue engineering

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The supporting information includes,

**Figure S1.** (a) The $^1$H spectrum of Eu-PVAc, (b) the $^{13}$C spectrum of Eu-PVAc.

**Figure S2.** (a) EDS spectrum, (b) mapping of Eu-PVAc.

**Figure S3.** The first, second, third, fourth and fifth loading stress-strain curves of (a) Sol-Eu-3 gel, (b) Fre-Eu-3 gel and (c) Exc-Eu-3 hydrogel. (d) Comparison of elastic modulus of Sol-Eu-3 gel, Fre-Eu-3 gel among the first, second, third, fourth and fifth immediate loadings.

**Figure S4.** The swelling properties of the Exc-Eu hydrogels.

**Figure S5.** DSC curves and TGA curves of the Exc-Eu-hydrogels.

**Table S1.** Water content of the different quality Exc-Eu hydrogels.

**Movie S1.** The Exc-Eu-3 hydrogel under car pressure with 385 nm UV light.

**Movie S2.** 1 kg weight was lifted up by the Exc-Eu-3 hydrogel without fracture.
Figure S1. (a) The $^1$H spectrum of Eu-PVAc, (b) the $^{13}$C spectrum of Eu-PVAc.

Figure S2. (a) EDS spectrum, (b) mapping of Eu-PVAc.
Figure S3. The first, second, third, fourth and fifth loading stress-strain curves of (a) Sol-Eu-3 gel, (b) Fre-Eu-3 gel and (c) Exc-Eu-3 hydrogel. (d) Comparison of elastic modulus of Sol-Eu-3 gel, Fre-Eu-3 gel and Exc-Eu-3 among the first, second, third, fourth and fifth immediate loadings.
Figure S4. The swelling properties of the Exc-Eu hydrogels.
Figure S5. DSC curves and TGA curves of the Exc-Eu-hydrogels.
Table S1. Water content of the different quality Exc-Eu hydrogels.

<table>
<thead>
<tr>
<th>Hydrogel</th>
<th>Weight (g)</th>
<th>Water content (%)</th>
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<tbody>
<tr>
<td></td>
<td>$W_0$</td>
<td>$W_1$</td>
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<tr>
<td>Exc-Eu-1</td>
<td>2.330</td>
<td>0.232</td>
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<tr>
<td></td>
<td>2.223</td>
<td>0.241</td>
</tr>
</tbody>
</table>

$W_0$: the weight of the hydrogels before drying;

$W_1$: the weight of the hydrogels at the dry state.