Supporting Information

Hybrid Lanthanide Complexes Based on a Novel β–Diketone Functionalized Polyhedral Oligomeric Silsesquioxane (POSS) and Their Nanocomposites with PMMA via in Situ Polymerization

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**Table S1.** Binding energy values of C\textsuperscript{1s}, O\textsuperscript{1s}, N\textsuperscript{1s}, S\textsuperscript{2p}, Tb\textsuperscript{4d} of POSS_Tb_3, POSS_dendrimer and Tb(NO\textsubscript{3})\textsubscript{3}·6H\textsubscript{2}O

<table>
<thead>
<tr>
<th>Condition</th>
<th>C\textsuperscript{1s} (eV)</th>
<th>O\textsuperscript{1s} (eV)</th>
<th>N\textsuperscript{1s} (eV)</th>
<th>S\textsuperscript{2p} (eV)</th>
<th>Tb\textsuperscript{4d} (eV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSS_Tb</td>
<td>284.7</td>
<td>532</td>
<td>407</td>
<td>162.7</td>
<td>153.3</td>
</tr>
<tr>
<td>Tb(NO\textsubscript{3})\textsubscript{3}·6H\textsubscript{2}O</td>
<td>284.8</td>
<td>533</td>
<td>408</td>
<td>162.7</td>
<td>151.7</td>
</tr>
</tbody>
</table>

**Figure S1.** (a) Photograph of POSS_Ln (Eu\textsuperscript{3+} and Tb\textsuperscript{3+}) complexes. (b), (c) Fluorescence images of POSS_Ln and PMS_Ln under 365 nm UV light.
Figure S2. FT-IR spectra of POSS_dendrimer and POSS_SH.

Figure S3. $^1$H NMR spectra of POSS_dendrimer
Figure S4. $^{13}$C NMR spectra of POSS_dendrimer.

Figure S5. $^{29}$Si NMR spectra of POSS_dendrimer.
Figure S6. FT-IR spectra of POSS_dendrimer.
Figure S7 MALDI-FTMS spectrum of POSS_dendrimer
Figure S8. XPS image of Tb$^{4d}$ in POSS_Tb_3 and Tb(NO$_3$)$_3$·6H$_2$O.

Figure S9. PXRD figures of POSS_Ln (Eu$^{3+}$ and Tb$^{3+}$).
Figure S10. POM images of POSS_Ln_3 (Eu$^{3+}$ and Tb$^{3+}$).

Figure S11. SAXS figures of POSS_Ln (Eu$^{3+}$ and Tb$^{3+}$).
Figure S12. UV spectra of POSS_Ln (Eu$^{3+}$ and Tb$^{3+}$) in THF solution (1.0×10$^{-4}$ M).

Figure S13. Thermal gravimetric analysis of POSS_Ln (Eu$^{3+}$ and Tb$^{3+}$) complexes.
Figure S14. FT-IR spectroscopy of PMMA nanocomposites.

Figure S15. Emission spectra of PMS_Ln (Eu$^{3+}$ and Tb$^{3+}$) in solid state.