A novel single-composition trichromatic white-emitting Sr$_{3.5}$Y$_{6.5}$O$_2$(PO$_4$)$_{1.5}$(SiO$_4$)$_{4.5}$:Ce$^{3+}$/Tb$^{3+}$/Mn$^{2+}$ phosphor: synthesis, luminescent properties and applications for white LEDs

Haikun Liua, Yi Luoa, Zhiyong Mao, Libing Lia*, Zhiguo Xia*a

*aSchool of Materials Science and Technology, China University of Geosciences, Beijing 100083, China
bShanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, China

Table S1. Crystallographic Data for Sr$_{3.5}$Y$_{6.5}$O$_2$(PO$_4$)$_{1.5}$(SiO$_4$)$_{4.5}$ Based on Rietveld Refinement.

<table>
<thead>
<tr>
<th>Formula</th>
<th>Sr$<em>{3.5}$Y$</em>{6.5}$O$_2$(PO$<em>4$)$</em>{1.5}$(SiO$<em>4$)$</em>{4.5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space group</td>
<td>P63/m</td>
</tr>
<tr>
<td>Cell parameters</td>
<td>$a = b = 9.4418(13)$ Å, $c = 6.8992(9)$ Å</td>
</tr>
<tr>
<td></td>
<td>$\alpha = 90^\circ$, $\beta = 90^\circ$, $\gamma = 120^\circ$</td>
</tr>
<tr>
<td></td>
<td>$V = 529.27(16)$ Å, $Z = 1$</td>
</tr>
<tr>
<td></td>
<td>$R$-Bragg = 5.74</td>
</tr>
<tr>
<td>Reliability factors</td>
<td>$R_{exp} = 4.56%$</td>
</tr>
<tr>
<td></td>
<td>$R_{wp} = 9.63%$</td>
</tr>
<tr>
<td></td>
<td>$R_p = 6.32%$</td>
</tr>
<tr>
<td></td>
<td>$GOF = 2.11$</td>
</tr>
</tbody>
</table>
Figure S1. Rietveld refinement XRD patterns of SYPSO Compound at room temperature by TOPAS program. (Solid red lines are calculated intensities, and circles are the observed intensities. Short vertical lines show the position of Bragg reflections of the calculated pattern. Gray solid lines below the profiles stand for the difference between the observed and the calculated intensities.)
Figure S2. Dependence of $I_{S0}/I_S$ of Ce$^{3+}$ on (a) $C^{6/3}$, (b) $C^{8/3}$, and (c) $C^{10/3}$. 

$R^2 = 0.9334$  $R^2 = 0.8635$  $R^2 = 0.8010$
Figure S3. Dependence of $I_{SO}/I_S$ of Ce$^{3+}$ on (a) $C^{6/3}$, (b) $C^{8/3}$, and (c) $C^{10/3}$. 

$R^2 = 0.9407$ for (a), $R^2 = 0.8725$ for (b), and $R^2 = 0.8105$ for (c).