One-Step Template-free Synthesis of BaSb$_2$O$_6$ Micro-flowers and Their Associated Photocatalytic Activity

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Figure S1. XRD patterns of the R-BaSb$_2$O$_6$ formed during different reaction time
Figure S2. XRD patterns of the R-BaSb$_2$O$_6$ synthesized at different temperatures (a), variation of R-BaSb$_2$O$_6$ morphologies with reaction temperature from 120 to 200 °C (b) ~ (d).

The reaction temperature related variation of R-BaSb$_2$O$_6$ morphologies is investigated. As shown in Figure S2, the rose-flower-like 3D hierarchical structures can be obtained at the range of 120~200 °C reacting for 48 hr at pH=3. However, only the samples synthesized at 200 °C shows the clear edges and sharp angles. While the samples synthesized at 160 °C and 120 °C are round and their edges are fuzzy. So, all the other samples in this paper were synthesized at 200 °C.
Table S1 The scales of samples synthesized at different pH values of precursor solution at 200 °C for 48 hr

<table>
<thead>
<tr>
<th>pH values</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale of the hexagonal plate or the hierarchical structures (μm)</td>
<td>16</td>
<td>11</td>
<td>7</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Thickness of one layer (μm)</td>
<td>1</td>
<td>0.7</td>
<td>0.1</td>
<td>0.1</td>
<td>----</td>
</tr>
</tbody>
</table>

1 Length of the longest diagonal of the hexagonal plate or the diameter of the hierarchical structures (μm).

Figure S3. XRD pattern of the white precipitate at 200 °C with pH=0.5 for 48 hr.
Figure S4. XRD patterns of M-BaSb$_2$O$_6$ formed during different reaction time.

Figure S5. XRD pattern of SSR-BaSb$_2$O$_6$
Figure S6 XPS of SSR-BaSb_2O_6 and flower-like BaSb_2O_6
Figure S7 DRS of flower-like BaSb$_2$O$_6$ and SSR-BaSb$_2$O$_6$