Supporting information for the manuscript

Photocatalytic Oxidation of Methane over CuO Decorated ZnO Nanocatalysts

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Turnover number calculations

Take reaction formula: CH₄ + 2O₂ → CO₂ + 2H₂O, the number of electrons gain and loss in the reaction is 8·e⁻¹. We assume that all electrons were excited by light. The amount of substance 20 mL CH₄: n₁ = 20mL/(22.4L•mol⁻¹) = 8.929×10⁻⁴ mol; The total amount of substance of electrons gain and loss in the photooxidation of 20 mL CH₄: n₂ = 8×8.929×10⁻⁴ mol = 7.1432×10⁻³ mol; For the 0.5 g 0.8wt%CuO/ZnO samples: the amount of substance for ZnO: n₃ = 99.2%×0.5/81.39 mol = 6.094×10⁻³ mol, the amount of substance for CuO: n₄ = 0.8%×0.5/79.545 mol = 5.029×10⁻⁵ mol. For ZnO, the Turnover number: n = 7.1432/6.094 = 1.172; For CuO, the Turnover number: n = 7.1432×10²/5.029 = 142.04
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<table>
<thead>
<tr>
<th>Samples</th>
<th>ZnO</th>
<th>0.1wt%CuO/ZnO</th>
<th>0.5wt%CuO/ZnO</th>
<th>0.8wt%CuO/ZnO</th>
<th>1.0wt%CuO/ZnO</th>
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</thead>
<tbody>
<tr>
<td>BET(m²·g⁻¹)</td>
<td>29.3</td>
<td>31.1</td>
<td>31.4</td>
<td>33.8</td>
<td>32.3</td>
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<tr>
<td>k(min⁻¹)</td>
<td>0.014</td>
<td>0.050</td>
<td>0.086</td>
<td>0.112</td>
<td>0.081</td>
</tr>
</tbody>
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