Electronic supplementary information

Promoting effects of MgO, (NH$_4$)$_2$SO$_4$ or MoO$_3$ modification in oxidative esterification of methacrolein over Au/Ce$_{0.6}$Zr$_{0.4}$O$_2$ based catalysts

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Fig. S1. STEM-EDS elemental mapping of catalysts Au/MgCZ (A) and Au/MoCZ (B).
Fig. S2. Mg 1s and Mo 3d XPS spectra of Au/MgCZ and Au/MoCZ catalysts, respectively.
Table S1 Reaction performance without catalyst or over MgCZ for the oxidative esterification of MAL with methanol

<table>
<thead>
<tr>
<th>Catalyst</th>
<th>Conversion (%)</th>
<th>Selectivity (%)</th>
<th>MMA</th>
<th>acetal</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>21</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MgCZ</td>
<td>29</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

*Reaction conditions: CH$_3$OH:MAL = 20:1 (molar ratio); CH$_3$OH, 15 mL; P (O$_2$) = 0.2 MPa; T = 343 K; t = 2 h.*

*MgCZ, 0.50g.*

*MMA, methyl methacrylate; acetal, 1,1-dimethoxy-2-methylpropylene.*