Selective hydrogenation of levulinic acid to γ-valerolactone over Ru/Mg-LaO catalyst

V. Swarna Jaya,* M. Sudhakar, S. Naveen Kumar and A. Venugopal
*Inorganic and Physical Chemistry Division, CSIR-Indian Institute of Chemical Technology, Hyderabad- 500 007, India.
Corresponding address
Tel.: +91-40-27193510; fax: +91-40-27160921;
E-mail address: swarnajv@gmail.com

Table S1. CO Chemisorption studies of different Ru catalysts

<table>
<thead>
<tr>
<th>Entry</th>
<th>Catalyst</th>
<th>Metal dispersion (%)</th>
<th>Metal surface area (m²/g) sample/metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RMO</td>
<td>1.4</td>
<td>0.3356/6.8</td>
</tr>
<tr>
<td>2</td>
<td>RMA</td>
<td>1.6</td>
<td>0.375/8.175</td>
</tr>
<tr>
<td>3</td>
<td>RML</td>
<td>1.7</td>
<td>0.4/8.7</td>
</tr>
</tbody>
</table>

Figure S1. TEM images of a) reduced Ru/MgO, b) particle analysis (avg. particle size ~12 nm)

Figure S2. TEM images of a) reduced Ru/MgAlO, b) particle analysis (avg. particle size ~10nm)
The normalized rate is calculated as per the formula

\[
\text{Rate} = \frac{\text{Fractional yield} \times \text{[Substrate]}_{\text{moles}} \times \text{[Room Temperature]}_{\text{Kelvin}} \times 1}{\text{[Catalyst]}_{\text{moles}} \times \text{[Reaction Temperature]}_{\text{Kelvin}} \times \text{[Pressure]}_{\text{bar}}} \]

\[
\text{Yield} = \frac{\text{Conversion} \times \text{Selectivity}}{100} = Y
\]

Fractional Yield = \( Y / 100 \)