Supplementary Information for:

Direct preparation of [(CH$_3$)$_3$NC$_{16}$H$_{33}$]$_4$Mo$_8$O$_{26}$ and its catalytic performance in oxidative desulfurization

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Fig.S1 EDS spectrum of the catalyst
Fig. S2 XRD patterns of the precursor and the catalyst (a) together with some standard XRD patterns (b)
Fig.S3 TG/DTG curve of the [(CH$_3$)$_3$NC$_{16}$H$_{33}$]$_6$Mo$_7$O$_{24}$ precursor
Fig. S4 GC profiles for the model fuel before and after oxidation
(Experimental conditions: initial sulfur concentration=500ppmwS, temperature=60°C, catalyst/oil =0.613%, O/S=5, time=90min)
Fig. S5 GC–MS analysis of oil phase.
Fig. S6 Solubilities of DBTO$_2$ in different solvents. (Compositions: pure n-octane, or $x$/octane=1:9 in mass, $x$=n-octene, para-xylene or naphthalene)
Fig. S7 FTIR spectra of DBT, DBTO$_2$ and the product
<table>
<thead>
<tr>
<th></th>
<th>C^a</th>
<th>H^a</th>
<th>N^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>[(CH$<em>3$)$<em>3$NC$</em>{16}$H$</em>{33}$)$_6$Mo$<em>7$O$</em>{24}$</td>
<td>49.6</td>
<td>9.1</td>
<td>3.0</td>
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<tr>
<td>[(CH$<em>3$)$<em>3$NC$</em>{16}$H$</em>{33}$)$_4$Mo$<em>8$O$</em>{26}$</td>
<td>39.3</td>
<td>7.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Catalyst^c</td>
<td>39.4</td>
<td>7.2</td>
<td>2.2</td>
</tr>
</tbody>
</table>

^a Measured in wt.%  
^b Calculated values  
^c Obtained by CHN elemental analysis