**INTRODUCTION**

The main anthropogenic greenhouse gas is CO₂ and many countries are very committed to reducing their atmospheric concentration using various solutions, such as the use of other energy sources such as solar and nuclear energy.

Developing a low temperature process for methanol synthesis will greatly reduce the production cost, and high CO₂ conversion becomes available at low temperature. Copper based catalysts (Cu-ZnO/Al₂O₃) were found to be effective towards methanol synthesis through CO or CO₂ hydrogenation.

**OBJECTIVES**

- Mixed Oxide (MO) HydroTalcite-Like Compound (HTLC)
- **Cu-Zn-Al** catalyst precipitation under different precipitation conditions
- Production of methanol (MeOH)
- Gas from anaerobic digestion as feedstock with a low biomethane potential

**RESULTS**

Comparing the conversion results obtained in this work, even though the pressure conditions established in this work are 5 times lower than those used by other authors which is an encouraging result. On the other hand, the selectivity to methanol is much lower. In view of these results, it is necessary to conduct further studies with this type of catalytic solids in order to achieve similar results to those reported, but at less severe reaction conditions in relation to pressure or to be able to explain why the selectivity to methanol is so low.

<table>
<thead>
<tr>
<th>Catalyst</th>
<th>Temp °C/Pres. (bar)</th>
<th>GHSV (h⁻¹)</th>
<th>X_CO (%)</th>
<th>StrMeOH (%)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu-Zn-Al (HTLC)</td>
<td>250/6.0</td>
<td>1840</td>
<td>3.91</td>
<td>100.0</td>
<td>Present work</td>
</tr>
<tr>
<td>Cu-Zn-Al (MO)</td>
<td>250/4.0</td>
<td>1860</td>
<td>19.02</td>
<td>6.88</td>
<td>Present work</td>
</tr>
<tr>
<td>CuZnO111 HTLC</td>
<td>260/30</td>
<td>8000</td>
<td>8.77</td>
<td>37.6</td>
<td>[30]</td>
</tr>
<tr>
<td>CuMn³⁺</td>
<td>260/30</td>
<td>8000</td>
<td>20.8</td>
<td>34.3</td>
<td>[30]</td>
</tr>
<tr>
<td>CuO</td>
<td>250/30</td>
<td>2400</td>
<td>12.0</td>
<td>95.0</td>
<td>Commercial benchmark catalyst</td>
</tr>
</tbody>
</table>

**CONCLUSIONS**

- **Cu-Zn-Al** polymetallic catalyst show higher conversion (19%) than hydrotalcite-like Cu-Zn-Al catalyst (4%), but it shows lower selectivity to methanol.
- The results obtained from the conversion of polymetallic and hydrotalcite catalysts are comparable to those obtained by other authors.
- Although the pressure in this work is 10 times lower than the pressure used commercially, good conversion results are obtained, even when the selectivity results are very low.

**REFERENCES**

- J. J. Pérez, D. J. Escalante, L. A. González, J. A. Perez. J. Chemical Engineering Department, University of La Laguna. e-mail: perezj@ull.es
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