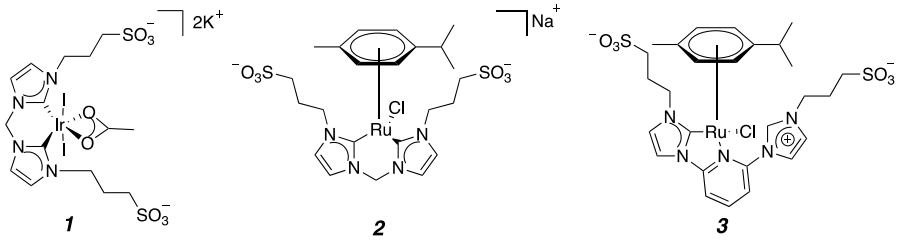
Catalytic Transfer Hydrogenation of CO2 to Potassium Formate using Glycerol as a Hydrogen Source

Technology #017-053-Voutchkova



To simultaneously transform CO_2 and glycerol, two low-value by-products, into formate and lactate can be highly economically attractive. Presently, however, it is challenging to achieve the reaction on an industrial scale.

GW researchers developed novel single-site supported heterogeneous catalysts that can simultaneously convert $CO_2$and glycerol into formate and lactate under batch or continuous flow conditions. The novel single-site supported heterogeneous catalysts consist of Ir or Ru N-heterocyclic carbene (NHC) that are functionalized with sulfonates. In addition, synthetic hydrotalcite can be used as a non-inert supporting structure to these Ir or Ru based catalysts.

To date, GW researchers are the first to convert CO_2 into formate under a CO_2–glycerol continuously flow system. Compared with previous processes, this new discovery generates less low-value by-products and has a higher activity. Initial research results are promising for scale-up synthesis competitive with existing industrial productions of formate and lactate.

Applications: simultaneously covert CO_2 and glycerol into high value formate and lactate.

Advantages:

- Simultaneously conversion
- First to achieve CO_2 transfer hydrogenation in a gas-liquid flow system
- High potential for industrial-scale continuous process
- Occurs at a lower temperature and pressure than previous processes, thus safer and more economical
- Reduce greenhouse emissions

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