

## Hydrogenolysis of alginic acid over mono- and bimetallic ruthenium/nickel supported on activated carbon catalysts with basic promoters

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Hydrogenolysis of alginic acid, derived from macroalgae, over Ru, Ni and Ru-Ni supported on activated carbon catalysts was performed using various basic promoters. Among the promoters used, NaOH provides the highest carbon efficiency and yield of glycols, such as ethylene glycol and 1,2-propanediol. In addition, various organic acids such as lactic acid, glycolic acid, and formic acid were produced in the form of salts. The hydrogenolysis of potential intermediates such as sorbitol, mannitol, lactic acid, and glycolic acid demonstrated direct conversion of alginic acid to glycols without sugar alcohols or organic acids as reaction intermediates. Furthermore, Ru-Ni bimetallic catalysts as a function of Ni/Ru molar ratio were used to increase the yield and selectivity of glycols. The highest yield of glycols, 24.1% was obtained when the Ni/Ru molar ratio was 1:1, due to the enhanced interaction between Ru and Ni based on H<sub>2</sub>-TPR.