

## Influence of the Zeolite Framework Type on the Green Synthesis of Acrylic Acid from Lactic Acid

Häussermann, D., Traa, Y.

Institute of Technical Chemistry, University of Stuttgart

### Abstract

Acrylic acid is an important chemical for the synthesis of acrylic acid esters and polymers used in coatings, adhesives, paints and personal care products. It is synthesized from fossil-based propene by selective oxidation via acrolein. One possibility for the green synthesis of acrylic acid is the fermentation of sugars or other renewable feedstock to lactic acid, which is afterwards selectively dehydrated to acrylic acid. This pathway is most selective, if lactic acid is simultaneously adsorbed on well-balanced nucleophilic (Nu) and electrophilic (EI) sites of the catalyst so that the dehydration occurs in a concerted way. This hinders side reactions such as the decarboxylation and decarbonylation to acetaldehyde on electrophilic sites. Alkali metal-exchanged zeolite catalysts can provide this balance of nucleophilic sites on the framework oxygen and electrophilic sites on the alkali metal cation. In this contribution, we show how the zeolite framework type influences the catalytic performance. We investigated small-pore, medium-pore and large-pore zeolites.

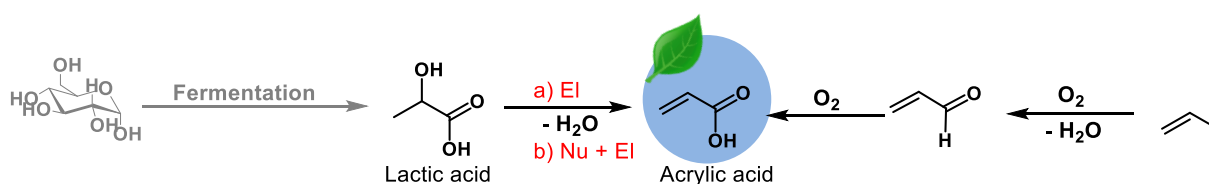


Fig. 1: Synthesis of acrylic acid from renewable or fossil feedstock.