Bachelor Thesis (or student research assistant)

Selective Hydrogenation of 1-Butyne on mixed-metal model-catalysts

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Theory

Alkene streams from cracking contain residues of dienes and alkynes. These need to be removed as they can lead to catalyst poisoning in downstream processes.

Separation by distillation not possible due to similar volatilities
→ selective hydrogenation necessary:

- Prevent full hydrogenation to alkanes
- Prevent isomerization to 2-butenes

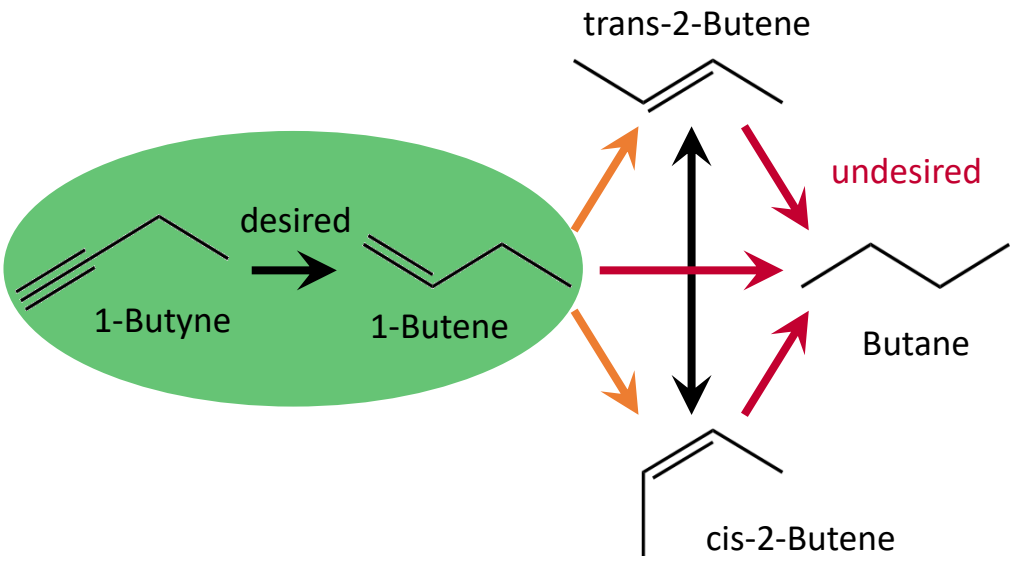
Aim

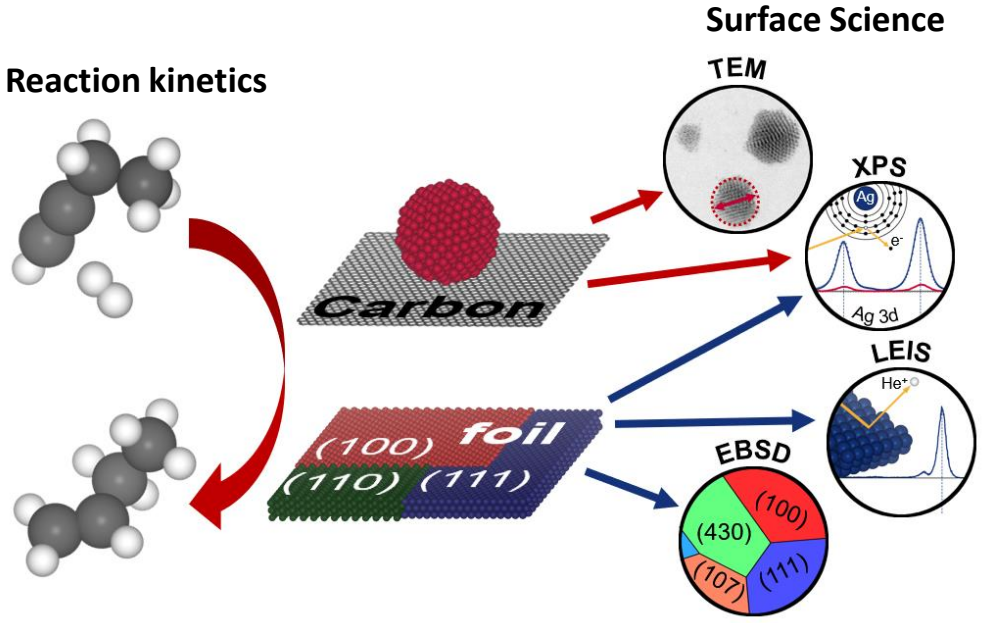
Understanding the relationship between the catalyst structure and its performance is critical to the development of more efficient catalysts. Recently, mixed metal catalysts have been shown to exhibit both high activity and selectivity in selective hydrogenation reactions outperforming single metal catalysts.

Methods

Operate a microreactor with gas chromatography product analysis to investigate kinetic parameters (activation energy, reaction orders and rates, …).
Compare the activity and selectivity of single and mixed metal foils and carbon supported single and mixed metal nanoparticles.

Characterize the catalyst by various techniques to analyze their surface properties.
Compare the catalysts before and after the reaction.





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