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## Magnetic catalysts

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#### Why magnetc?

Separation
Ease recycling of valuable noble metals



Localization of the heat where needed, a technology suited to push many catalytic reactions **beyond** the reactor heat transfer limits, to the limits of the process kinetics. Advantages: more favourable energy balance, process intensification, reactor setup,

## 1. Magnetic heating



simplification, reduced safety issues, minor operational costs, increased process productivity and decentralisation.<sup>1</sup>



- Facile and scalable method for preparation of Ru based catalyst,
- Nanocomposite: magnetic nanoparticles dispersed within C material, decorated with Ru nanoparticles





S. Gyergyek et. al. Mater. Res. Lett. 2018, 6, 426.









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## ■ HMAB, ● HMPB, □ HPB, □HMPC, □ PB, □ HPC, □ HHPC, □ PC, --- temperature profile over the reaction

- hydrogenation is nearly 5-times more favoured than the deoxygenation,
- removal of the methoxy group from the HMPB is 28-times faster than that of the hydroxyl group from the HPB,
- deoxygenation of saturated rings is an order of magnitude faster than that of the unsaturated products.

S. Gyergyek et. al. *Mater. Res. Lett.* 2018, **6**, 426.



Magnetic heating







- Active, selective and stable hydrogenation magnetic catalyst can be prepared by simple, scalable green methods,
- Magnetic heating shows advantages in faster heat-up and higher "effective" temperature leading to faster kinetics

## Thank you for your attention

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