The selective oxidation of cinnamyl alcohol to cinnamic acid: A lesson in active site spatial control and process scale-up using Pd- and Pt- catalysts

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Keywords: Oxidation, Continuous flow, Spatial ordering.

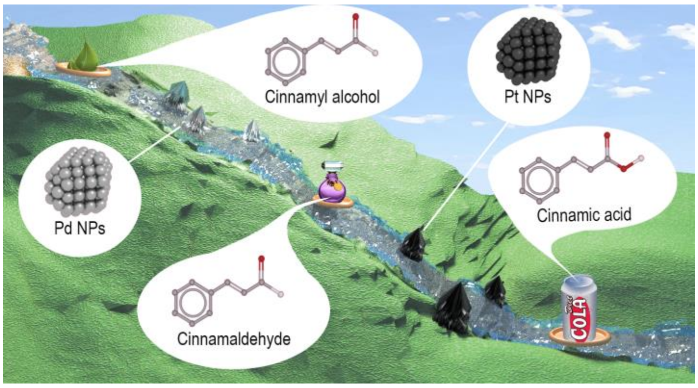

Figure 1. A schematic representation of the multi-step transformation of cinnamyl alcohol to cinnamic acid

Achieving high selectivity in catalytic cascades requires careful control over the sequence of interactions between reactant, intermediates, and active sites. Supported palladium and platinum nanoparticles are excellent catalysts for the respective aerobic selective oxidation of cinnamyl alcohol to cinnamaldehyde[1-3] and of cinnamaldehyde to cinnamic acid,[3-4] but are ineffective for the direct oxidation of alcohol to acid (**Figure 1**).

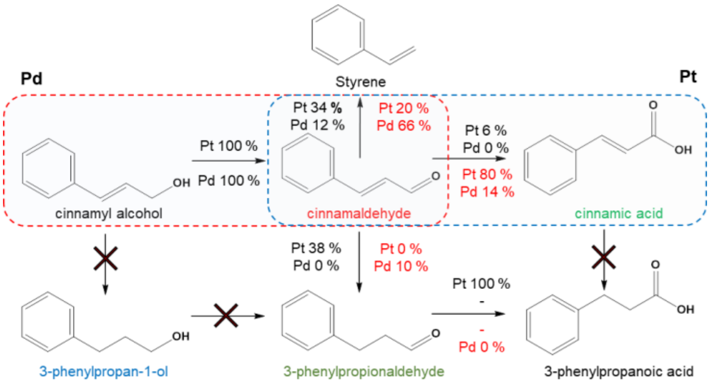

Figure 2. Reaction network/selectivities for the oxidation of cinnamyl alcohol to cinnamic acid over Pd/SBA-15 and Pt/SBA-15 catalysts.

Here we show how continuous flow operation, and close-coupling of Pd/SBA-15 and Pt/SBA-15 in a dual bed configuration, affords a high single pass yield of 84 % and excellent stability for the cascade oxidation of cinnamyl alcohol to cinnamic acid.[5]

References

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