

Supplementary material

Application-driven design of biocatalyst for the continuous synthesis of levulinate esters from α -angelica lactone: synergistic effect of silica, triflate ionic liquid and lipase

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[N_{8,8,8,1}][OTf]:

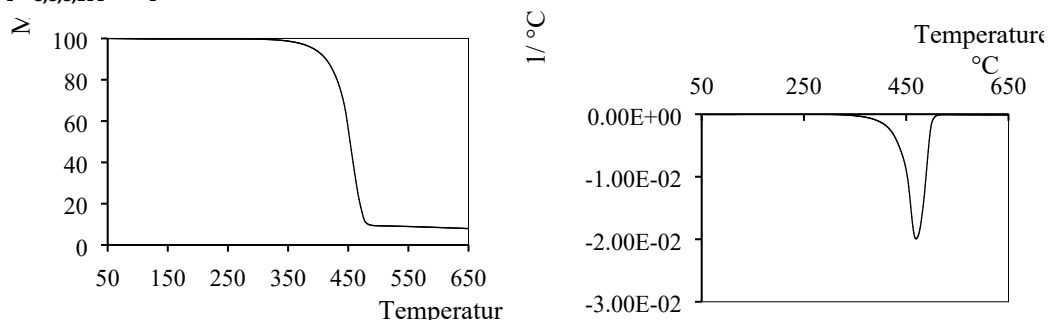


Fig. S1. TGA/DTG Analysis for [N_{8,8,8,1}][OTf].

CALB:

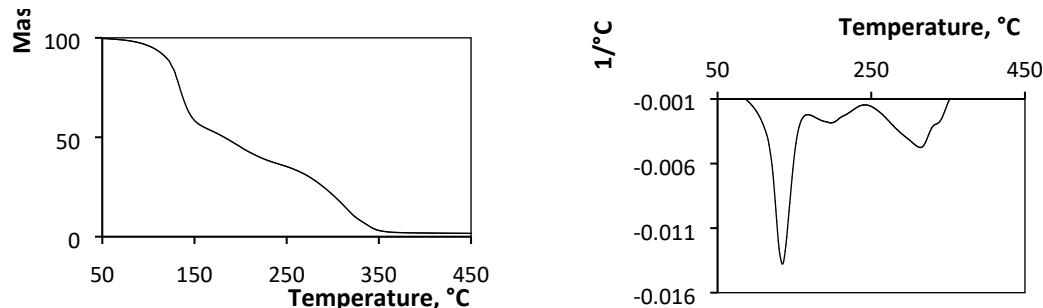


Fig. S2. TGA/DTG Analysis for CALB.

SiO₂-[N_{8,8,8,1}][OTf]:

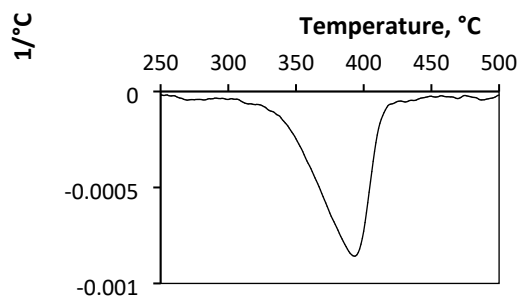
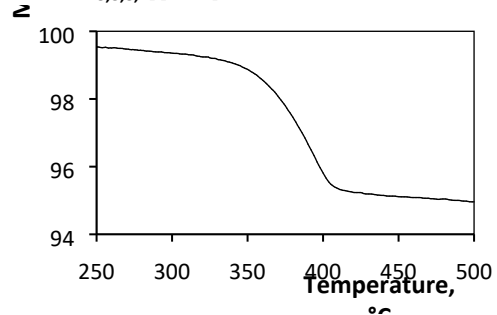


Fig. S3. TGA/DTG Analysis for SiO₂-[N_{8,8,8,1}][OTf].

SiO₂-[N_{8,8,8,1}][OTf] -CALB:

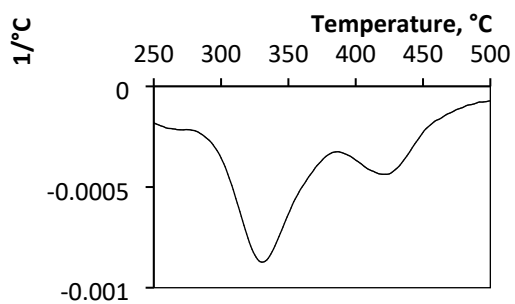
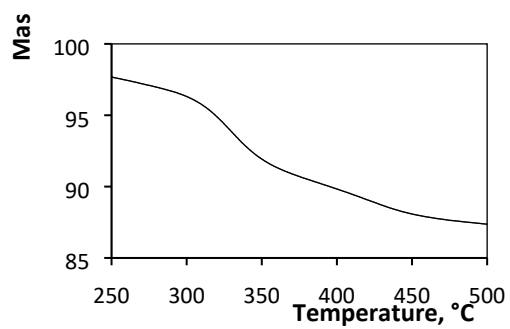
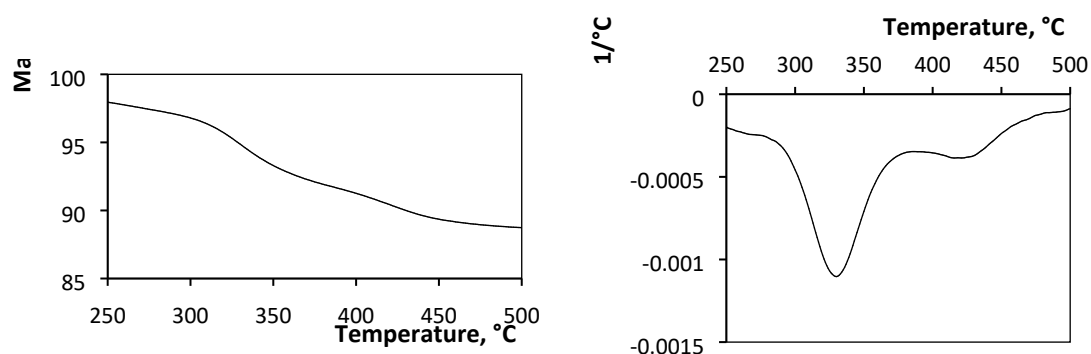


Fig. S4. TGA/DTG Analysis for SiO₂-[N_{8,8,8,1}][OTf] -CALB.

SiO₂- [N_{8,8,8,1}][OTf] -CALB recycled:



SiO₂- [N_{8,8,8,1}][OTf] -CALB after 144 h in the flow reactor:

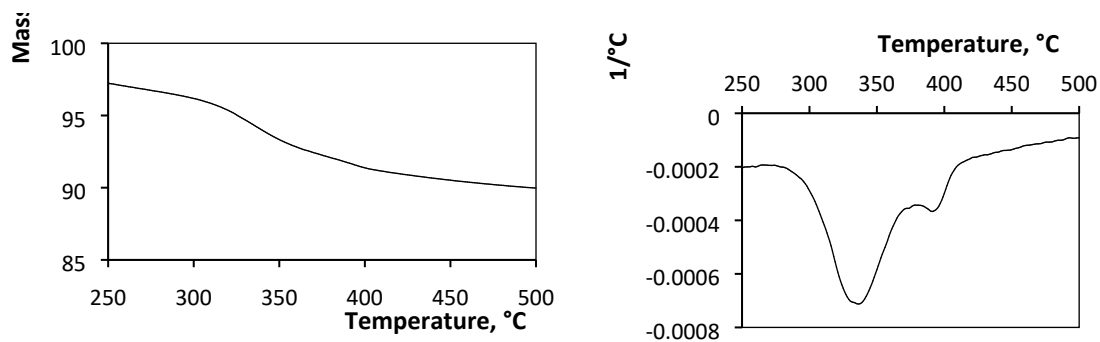
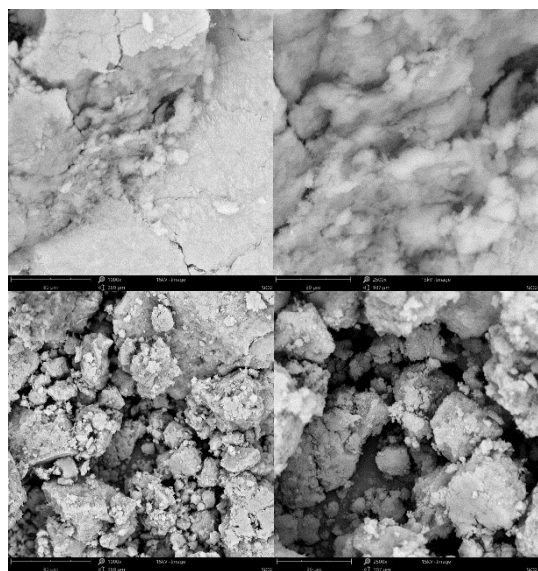


Fig. S5. TGA/DTG Analysis of SiO₂-[N_{8,8,8,1}][OTf] -CALB after reactions.

SiO₂



SiO₂- [N_{8,8,8,1}][OTf] -CALB

Fig. S6. SEM analysis of silica and SiO₂-[N_{8,8,8,1}][OTf] -CALB.