Carbon-carbon condensation of biomass-based furans using shape-controlled metal oxide-based catalysts

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The carbon-carbon (C-C) condensation of biomass-derived furans is a promising approach for producing renewable diesel fuel precursors. In particular, the C-C condensation of furfural and 2-methylfurfural using a potential heterogeneous catalyst with optimum acidic properties gives a renewable C-15 diesel fuel precursor. We developed a highly selective heterogeneous Nb_2O_5 nanocatalyst for solvent-free C-C condensation of bio-furans. The morphology-controll of Nb_2O_5 particles (nanorods) and calcination at 300 ^oC provided optimum acid sites for catalyzing the condensation of furfural with 2-methylfuran. A wide range of renewable diesel fuel precursors by applying various substituted furans and benzaldehydes were synthesized using the Nb_2O_5 catalyst. The Nb_2O_5 catalyst is stable in terms of structure and morphology and showed good reusability for up to 5 cycles. The practical feasibility of this catalytic approach was elucidated by estimating sustainable green chemistry metrics. The conceptualization, synthesis, and detailed structure-activity properties of shape-controlled Nb_2O_5 catalysts for the C-C condensation of furfural and 2-methylfurfural will be comprehensively addressed in the presentation [1-6].

References

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BIO

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