Title:	Selective Oxidation of Biomass-Derived 5-Hydroxymethyl Furfural with Manganese Oxide-Based Catalysts
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Abstract:	ABSTRACT As an indispensable carbon source, lignocellulosic biomass can be used as feedstock for producing bio-based platform chemicals and fuels. Chemical industries and research institutes have been thriving for energy-efficient and economically feasible processes for the utilisation of bio-based feedstock, substantially lowering carbon emissions. Regarding this, 5-hydroxymethyl furfural (HMF) is one of the most pivotal multifunctional biomass platform chemicals, which has gained great significance in industry and academia. HMF can be derived from the cellulosic part of the biomass and can be used as a starting substrate to produce a wide array of chemicals. Among the furanics products, FDCA is known to potentially replace fossil- based terephthalic acid to produce bioplastic (PEF) instead of PET polymer, in addition to other applications in producing polyesters, polyamides, copolymers, solvents and plasticisers. Thus, the primary aim of the work is the selective oxidation of the biomass-derived substrate, that is, HMF to DFF/FFCA/FDCA with manganese oxide-based chemocatalysts. The presentation will reflect on how Mn-based catalysts have been developed for the selective oxidation of HMF to DFF/FFCA/FDCA. Based on the analytical techniques employed, the characteristic features of the manganese oxide-based materials that enhanced the catalytic activity towards selective oxidation will be discussed. Further, attempts have been made to transform biomass-derived sugars, such as inulin, fructose, and sucrose, as model compounds and have also been employed to produce crude HMF followed by furanic production (DFF/FFCA/FDCA) in a cascade reaction- a one-pot, two-step approach- with a combination of metal-containing chemo catalysts. Attempts have also been made to transform underutilised agro-residue, such as rice straw, to produce crude HMF, followed by furanic production. The employed process entails mild pretreatment of rice straw using an ammonia solution to obtain an enriched holocellulose-based solid residue and convert it to potential chemicals using chemo catalysis.
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