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A series of Mn−Co binary oxides were prepared by a simple thermal decomposition procedure and evaluated for the aerobic oxidation of 5-hydroxymethylfurfural (HMF) into 2,5-diformylfuran (DFF). Investigation of the effects of metal amounts and calcination temperatures of the prepared catalysts revealed that the Mn−Co binary oxide with a Mn/Co molar ratio of 1/1 showed the best catalytic performance yielding 42.6% HMF conversion along with 98% selectivity to DFF after 2 h of reaction. The as-prepared catalysts were characterized by nitrogen physisorption, X-ray powder diffraction (XRD), hydrogen temperature-programmed reduction (H2-TPR) and X-ray photoelectron spectroscopy (XPS). These results indicated that the Mn−Co binary oxides could increase the Mn4+/Mn3+ atomic ratio and the exposed lattice oxygen content on the surface, thus accelerating the HMF oxidation into DFF. Furthermore, the Mn−Co binary oxides proved to be reusable in five consecutive reaction runs without significant loss of activity.

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