

Electronic Supporting Material

Enhancing Selective Oxidation of n-Butane to Maleic Anhydride: Role of Catalyst Structure-Activity Relationship

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Fig. S7 The catalytic performance of ball milling-based 1%MXene-promoted VPO catalysts at different temperatures. The reagent gas ($\text{air}/\text{n-C}_4\text{H}_{10} = 1.34 \text{ vol. } \%$) was supplied at 0.1~0.15 MPa pressure with a flow rate of $2000 \text{ h}^{-1} \text{ GHSV}$.

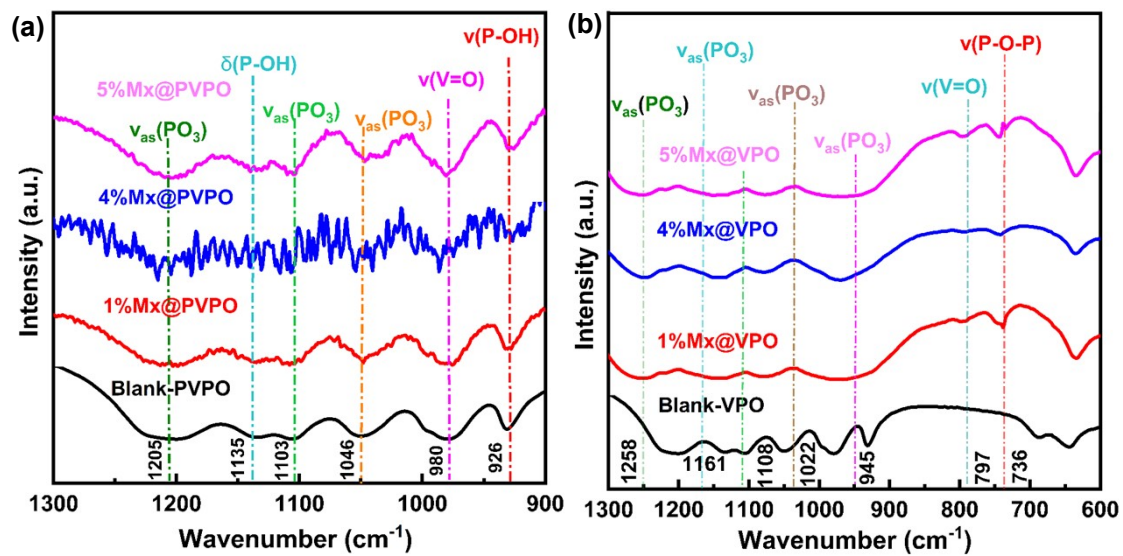


Fig. S1 FT-IR patterns of unpromoted and promoted precursors (a) and catalysts (b).

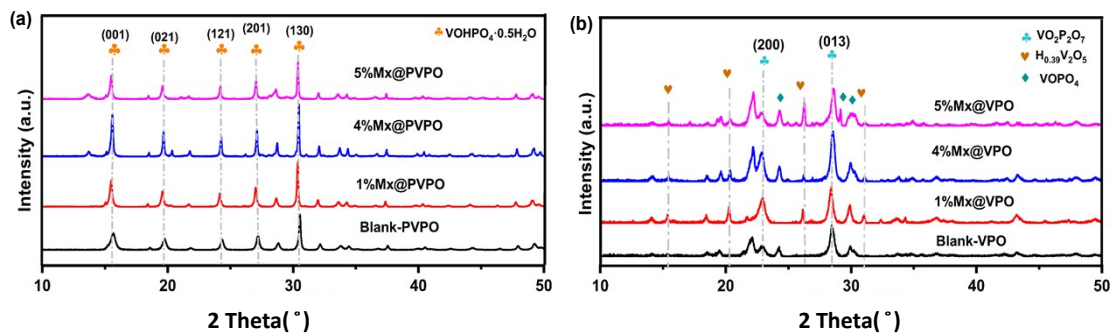


Fig. S2 XRD patterns of unpromoted and promoted precursors (a) and catalysts (b).

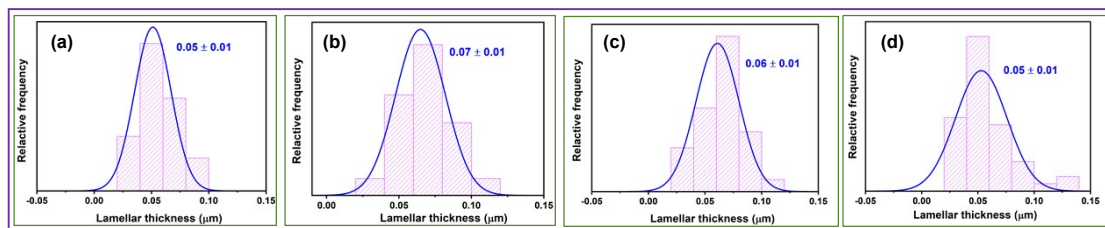


Fig. S3 Lamellar thickness of unpromoted (Blank-PVPO) (a₂) and promoted precursors 1%Mx@VPO (b), 4%Mx@VPO (c) and 5%Mx@VPO (d).

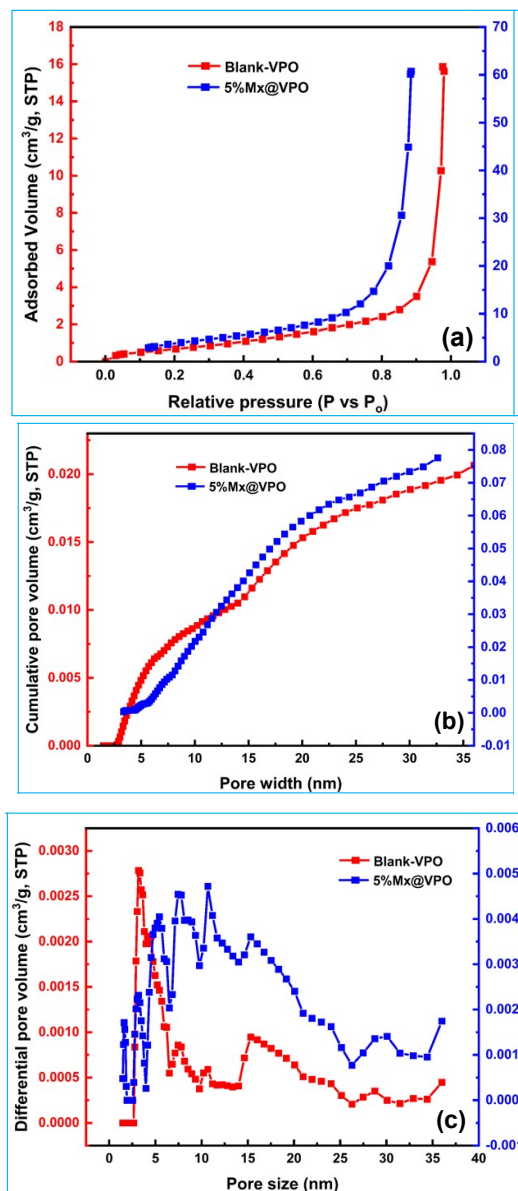


Fig. S4 The surface morphology of unpromoted (Blank-VPO) and promoted (5%Mx@VPO) catalysts evaluated from the correlation of relative pressure (P/P_0) with adsorbed volume (cm^3/g) (a), pore width (nm) with cumulative pore volume (cm^3/g) (b) and pore size (nm) with differential pre volume (cm^3/g) (c) at STP.

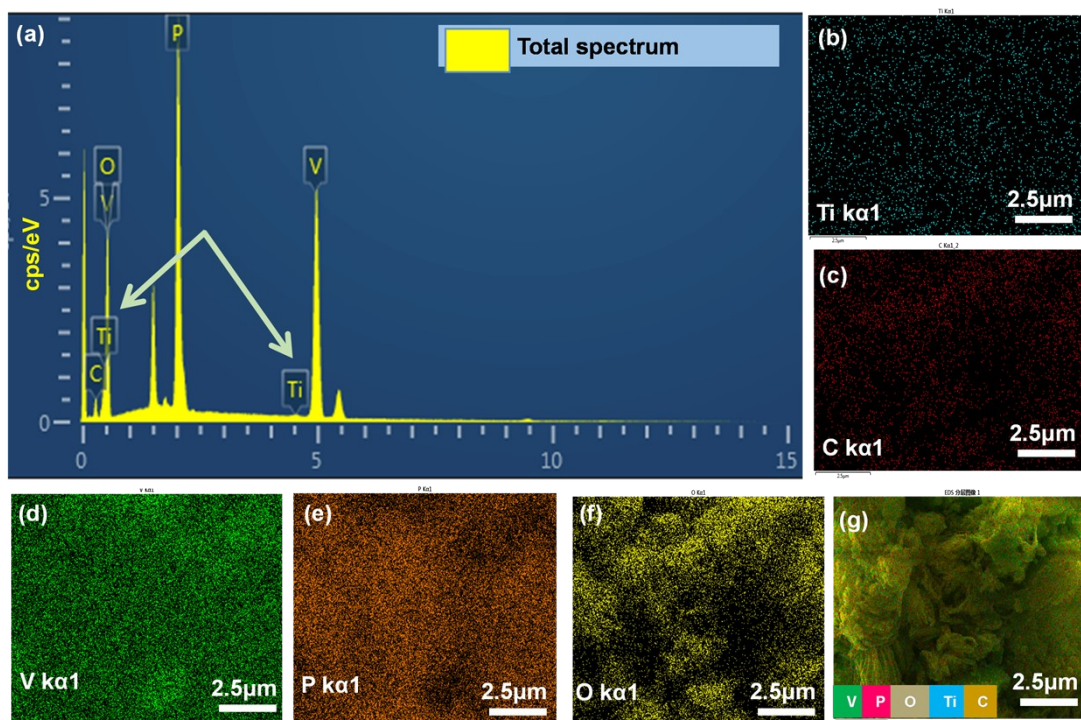


Fig. S5 EDS spectrum of V, P, O, Ti, and C of the 5%Mx@VPO catalyst (a) and their compositional distribution of titanium (b), carbon (c), vanadium (d), phosphorus (e), oxygen (f) and all elements (g) displayed from EDS mapping.

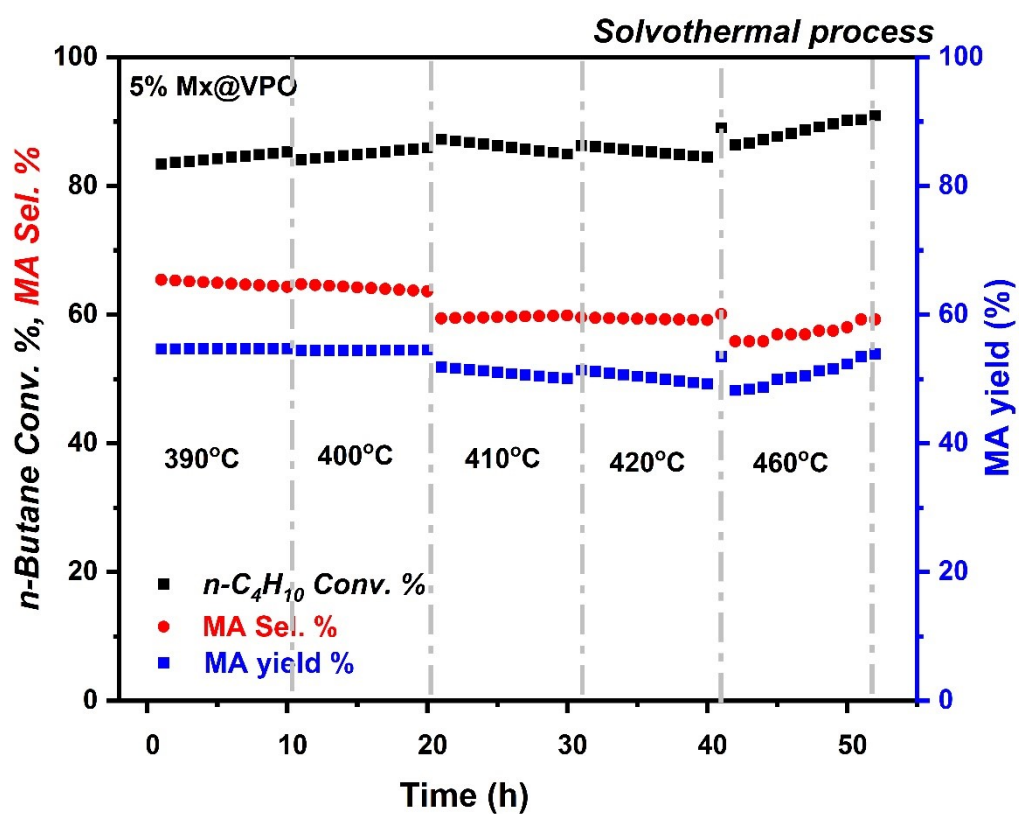


Fig. S6 The catalytic performance of solvothermal-based 5 %MXene-promoted VPO catalysts at different temperatures. The reagent gas (air/*n*-C₄H₁₀ = 1.34 vol. %) was supplied at 0.1~0.15 MPa pressure with a flow rate of 2000 h⁻¹ GHSV.

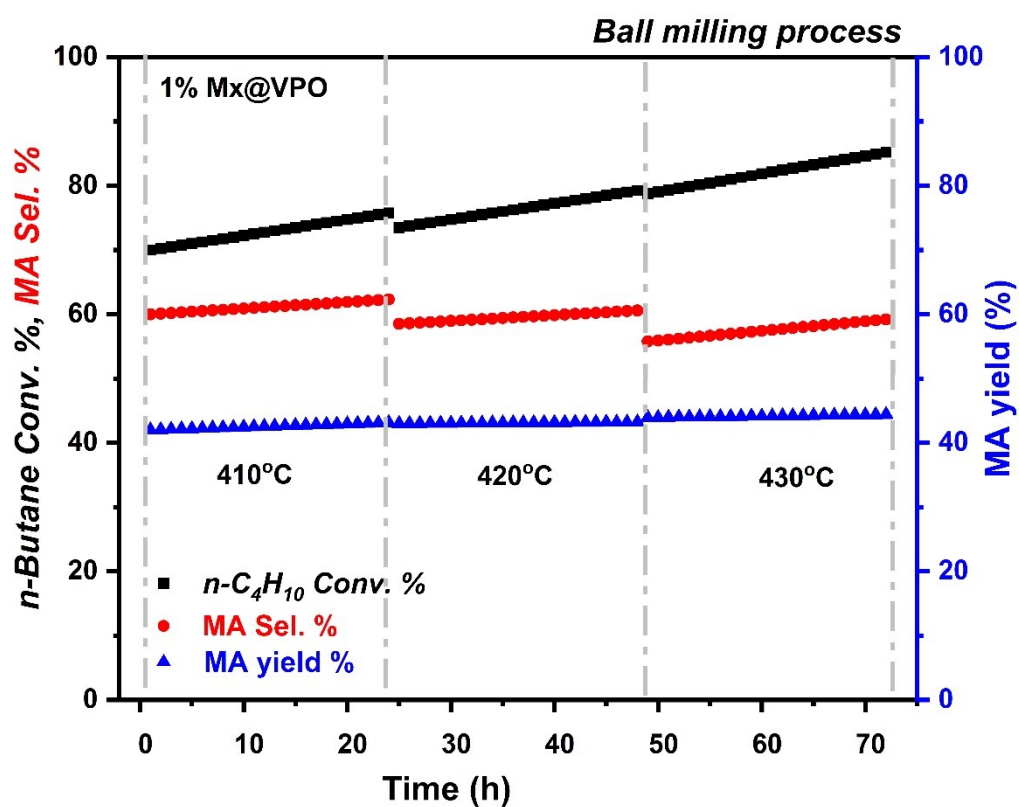


Fig. S7 The catalytic performance of ball milling-based 1%MXene-promoted VPO catalysts at different temperatures. The reagent gas (air/n-C₄H₁₀ = 1.34 vol. %) was supplied at 0.1~0.15 MPa pressure with a flow rate of 2000 h⁻¹ GHSV.