Supporting Information

Template-free synthesis of mesoporous X-Mn (X = Co, Ni, Zn) bimetal oxides and catalytic application in room-temperature removal of low-concentration NO

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Fig. S1. XRD patterns of the precursors with single metal element (Mn (or Co, Ni, Zn)-oxalate) or two metal elements (Co (or Ni, Zn)$_x$Mn$_y$-oxalate).

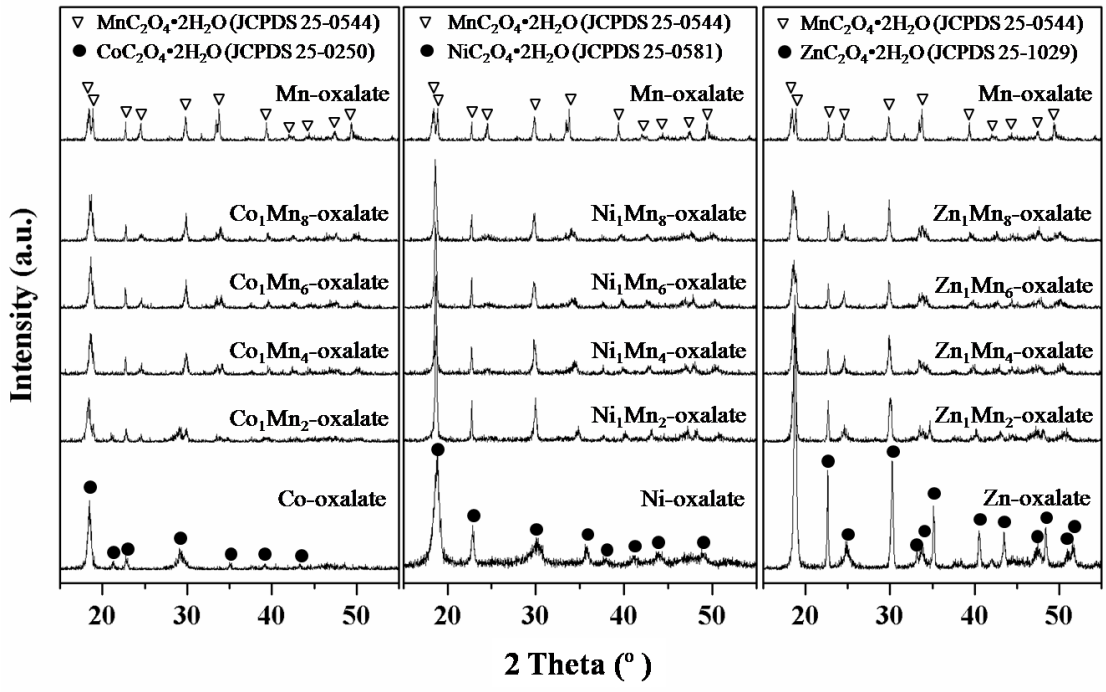

Fig. S2. TG curves of three representative bimetal precursors (Co_1Mn_6-oxalate, Ni_1Mn_8-oxalate and Zn_1Mn_6-oxalate) and four single-metal precursors (Mn (or Co, Ni, Zn)-oxalate).

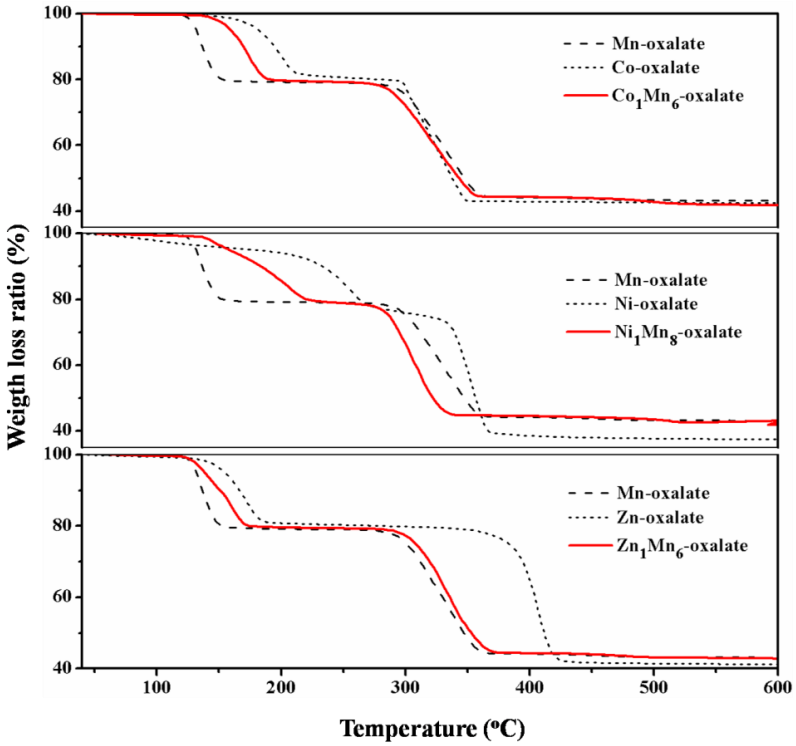

Fig. S3. XRD patterns of the 300 °C calcined samples with single metal element (Mn (or Co, Ni, Zn)-300) or two metal elements (Co (or Ni, Zn)$_x$Mn$_y$-300).

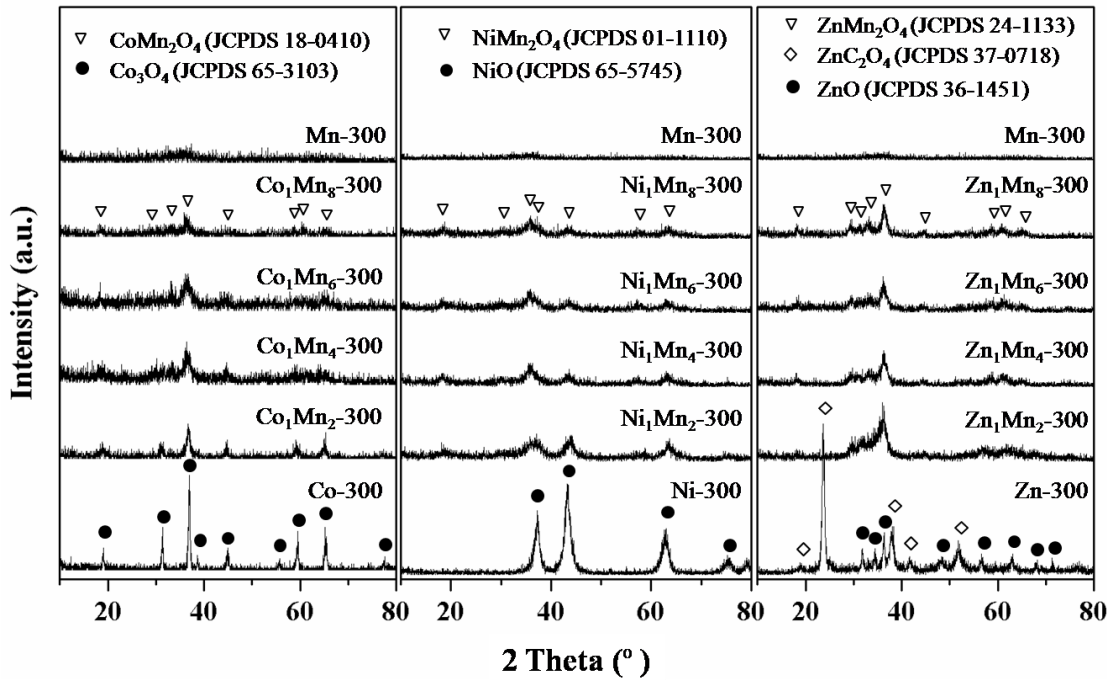

Fig. S4. Low-angle XRD patterns of Co_1Mn_6-300, Ni_1Mn_8-300 and Zn_1Mn_6-300.

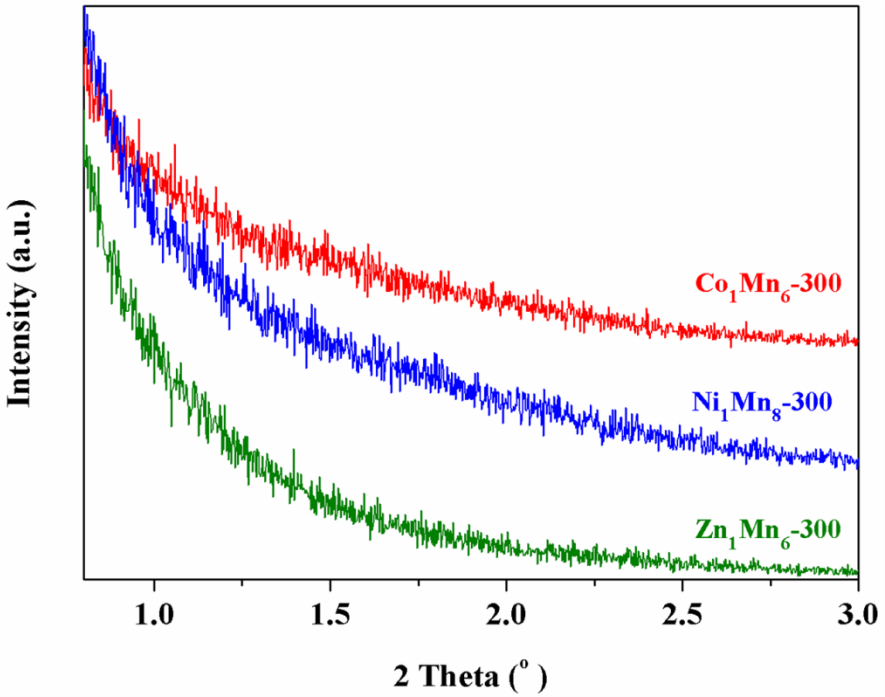

Fig. S5. H_2-TPR curves of Mn-300, Co_1Mn_6-300, Ni_1Mn_8-300 and Zn_1Mn_6-300.

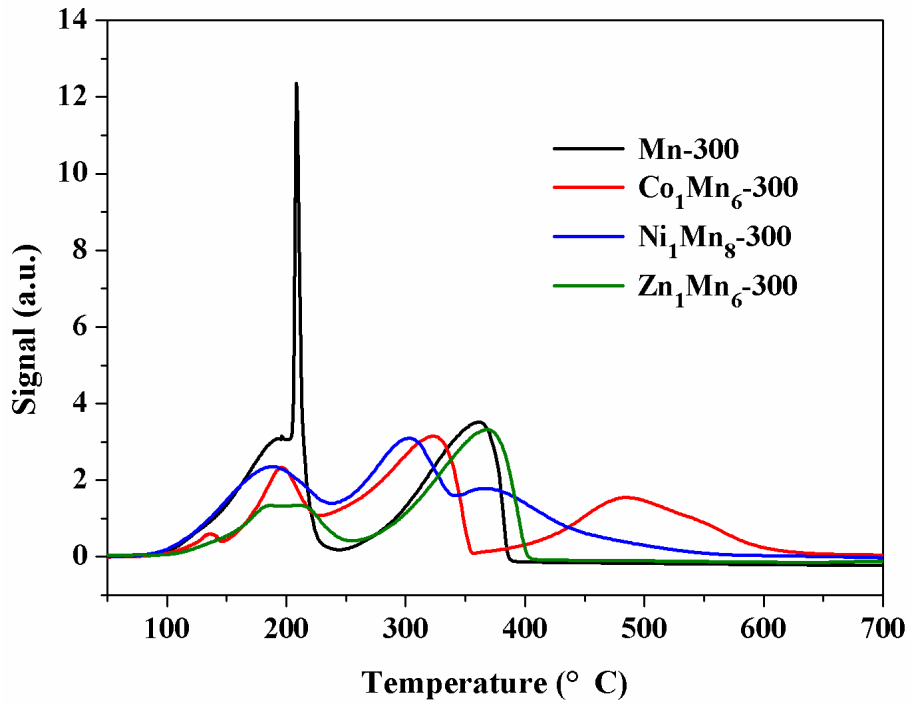

Fig. S6. Time courses of NO removal on Co_1Mn_6-300, Co_1Mn_6-400, Ni_1Mn_8-300, Ni_1Mn_8-400, Zn_1Mn_6-300 and Zn_1Mn_6-400. Reaction conditions: [NO] = 10 ppm, [O_2] = 21 %, balance = N_2, temperature = 25 °C and GHSV = 120,000 $mL \cdot g^{-1} \cdot h^{-1}$.

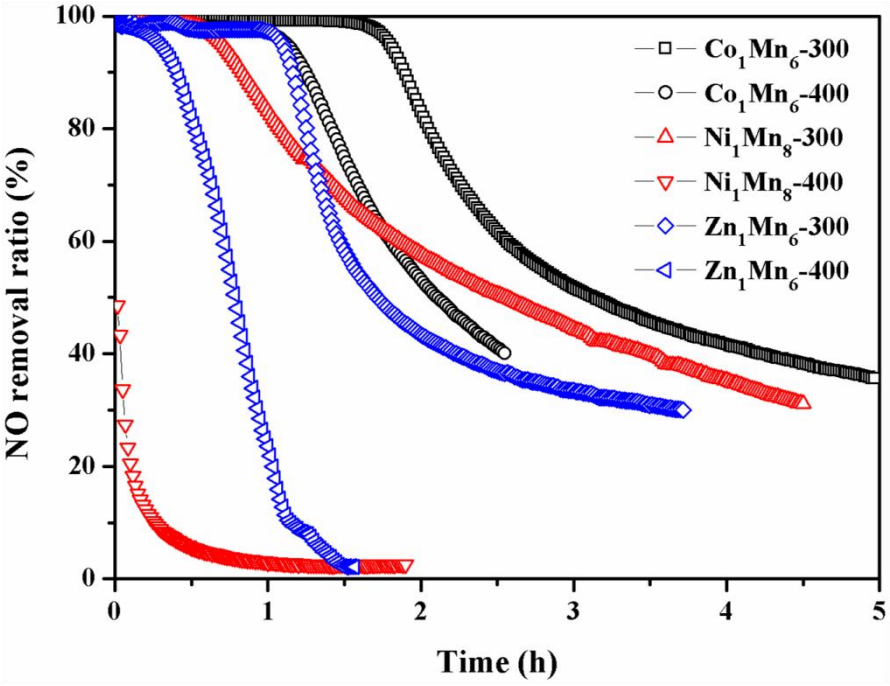

Fig. S7. Time courses of outlet concentrations of NO and NO_2 in the NO adsorption tests in the O_2-free condition on Co_1Mn_6-300, Ni_1Mn_8-300 and Zn_1Mn_6-300. Reaction conditions: [NO] = 10 ppm, balance = N_2, temperature = 25 °C and GHSV = 120,000 $mL \cdot g^{-1} \cdot h^{-1}$.

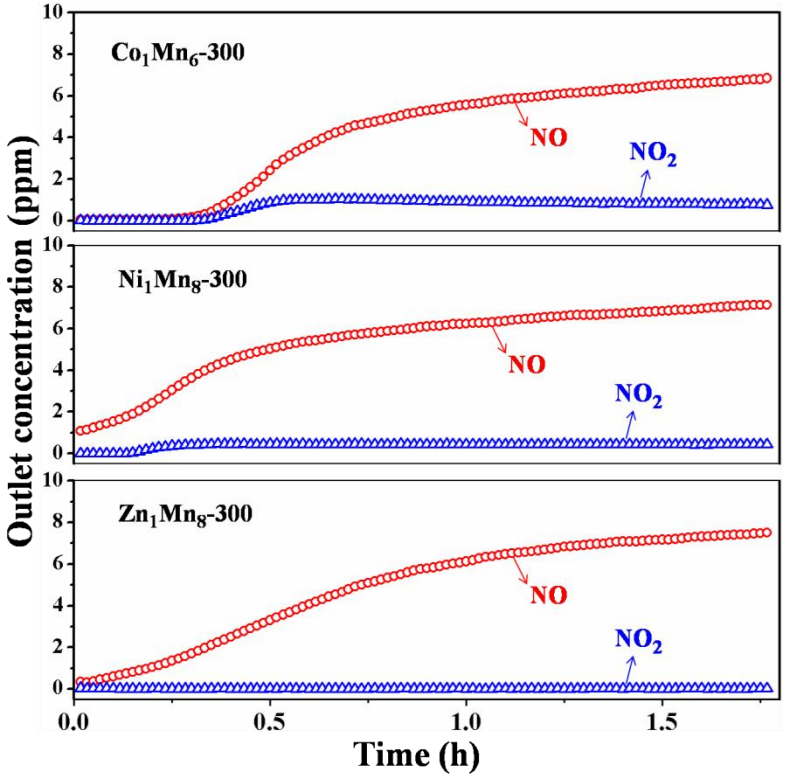

Fig. S8. TPD curves of Co_1Mn_6-300, Ni_1Mn_8-300 and Zn_1Mn_6-300 after the first cycles of NO removal tests.