Electronic Supplementary Material (ESI) for Nanoscale.
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Electronic Supplementary Information (ESI)

Porous Ni-Mn oxides nanosheets *in-situ* formed on nickel foam as 3D hierarchical monolith de-NO_x catalysts

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Part I. Experimental details of the NM/cordierite catalysts

The commercial cordierite support (400 cells per square inch, square channels=1 mm^2 and a wall thickness =100 um) was purchased from the Yixing Weimin Ceramics Factory (China). Before use, the cordierite was pretreated in the 3 mol/L oxalic acid aqueous solution at 90 ^oC for 2 h. Subsequently, the obtained products were washed by deionized water for several times and dried overnight.

In a typical synthesis, according to the obtained weight percentage of Ni-Mn oxides nanosheets on nickel foam by an ICP-AES techniques, 0.12 mmol of $Mn(NO_3)_2$ and 0.72 mmol of $Ni(NO_3)_2$ were dispersed in 20 ml deionized water under stirring for 15 min. Afterwards, 3 cm^2 of the treated cordierite were immersed into the homogeneous solution and dried at 60 ^oC for 20 h. Finally, the products were calcined in air at 500 ^oC for 4 h by a ramping rate of 2 ^oC/min.

Part II. Supplementary SEM images, elemental data and catalytic experimental results

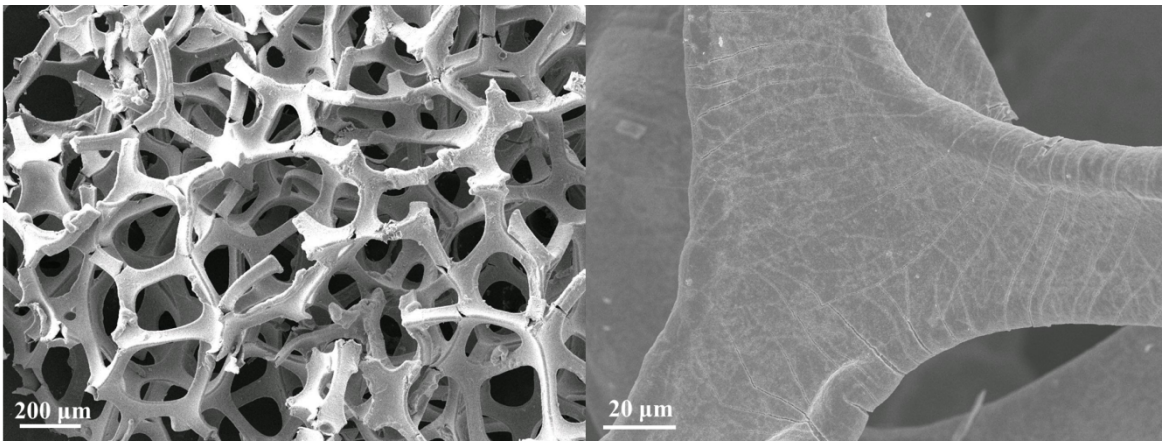

Fig. S1 SEM images of the NF catalysts.

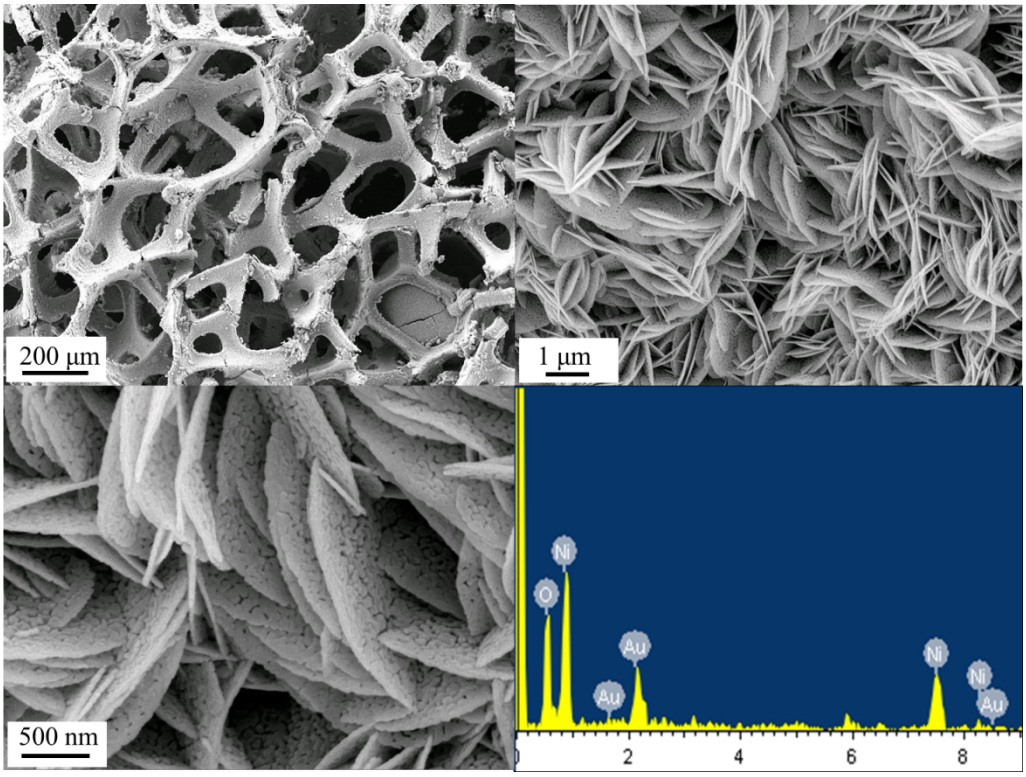

Fig. S2 a-c) SEM images of the 3DH-N/NF catalysts, and d) Energy dispersive X-ray (EDX) result of the 3DH-N/NF catalysts.

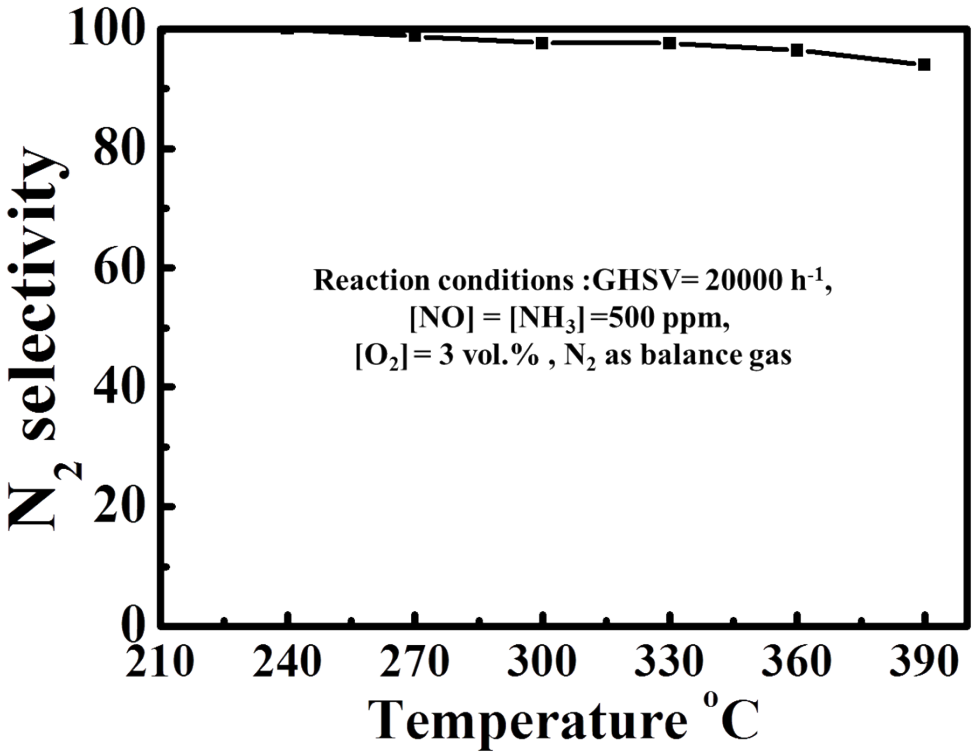

Fig. S3 N_2 selectivity of the 3DH-NM/NF catalysts.

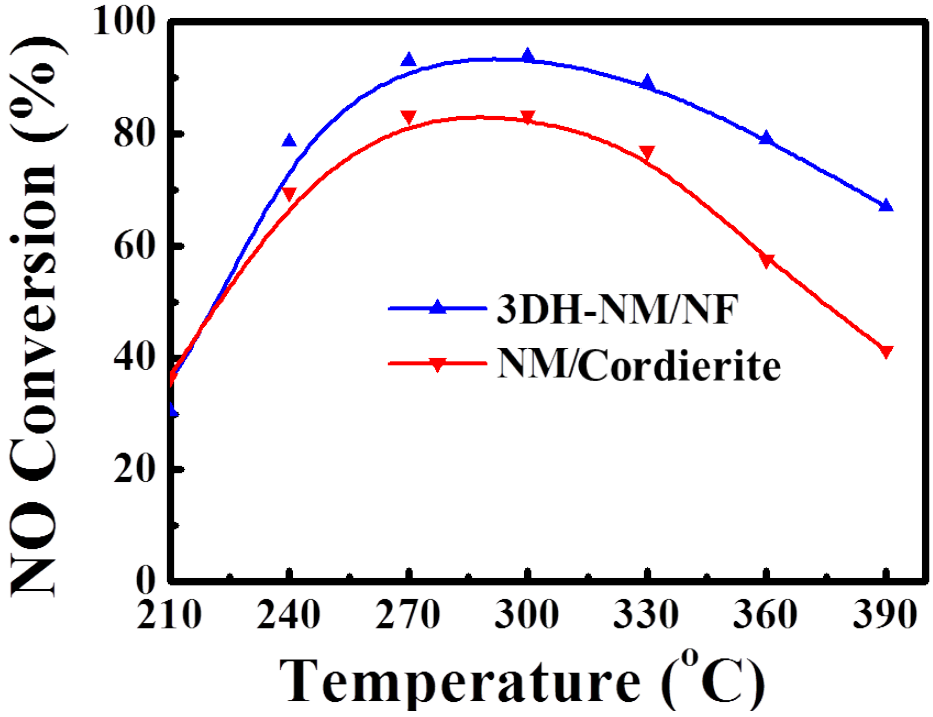

Fig. S4 NH_3-SCR performance of the 3DH-NM/NF catalysts and the NM/cordierite catalysts, Reaction conditions: [NO] = [NH_3] =500 ppm, [O_2] = 3 vol. %, N_2 as balance gas, and GHSV=20000 h^{-1}.

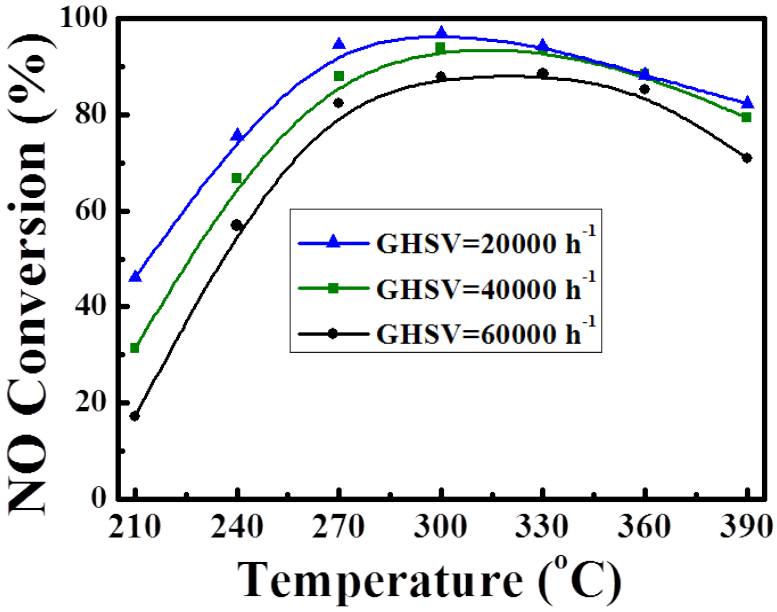

Fig. S5 NH_3-SCR performance of 3DH-NM/NF catalysts under different gas hourly space velocity, Reaction conditions: [NO] = [NH_3] =500 ppm, [O_2] = 3 vol. % and N_2 as balance gas.