

Synthesis of Co doped MnO₂ catalysts with the assist of PVP for low-temperature SCR

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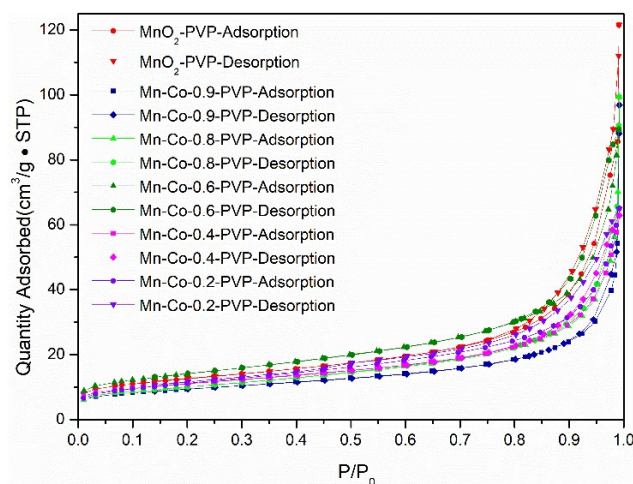
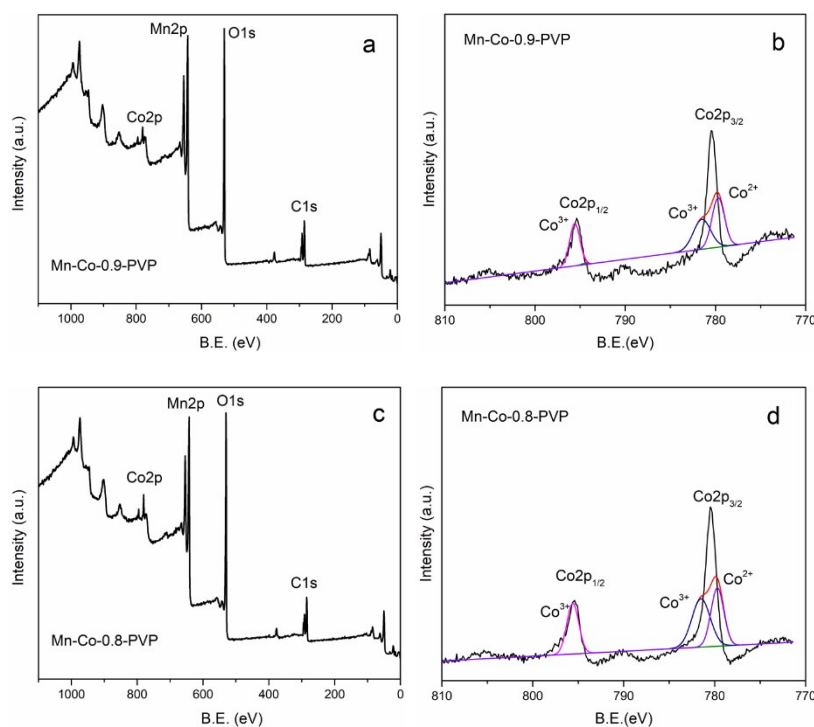


Figure S1. The N₂ adsorption-desorption isotherms of Mn-Co-X-PVP catalysts.

The nitrogen adsorption desorption isotherms of each catalyst sample are illustrated in Figure S1. These showed typical Langmuir IV isotherms and H3 type hysteresis loops, indicating that these catalysts are mesoporous materials. The specific surface area, pore volume and other data of each catalyst sample were listed in Table S1. It can be seen that with the increase of Co doping, the specific surface area, pore volume and other data of catalyst sample have not changed significantly.



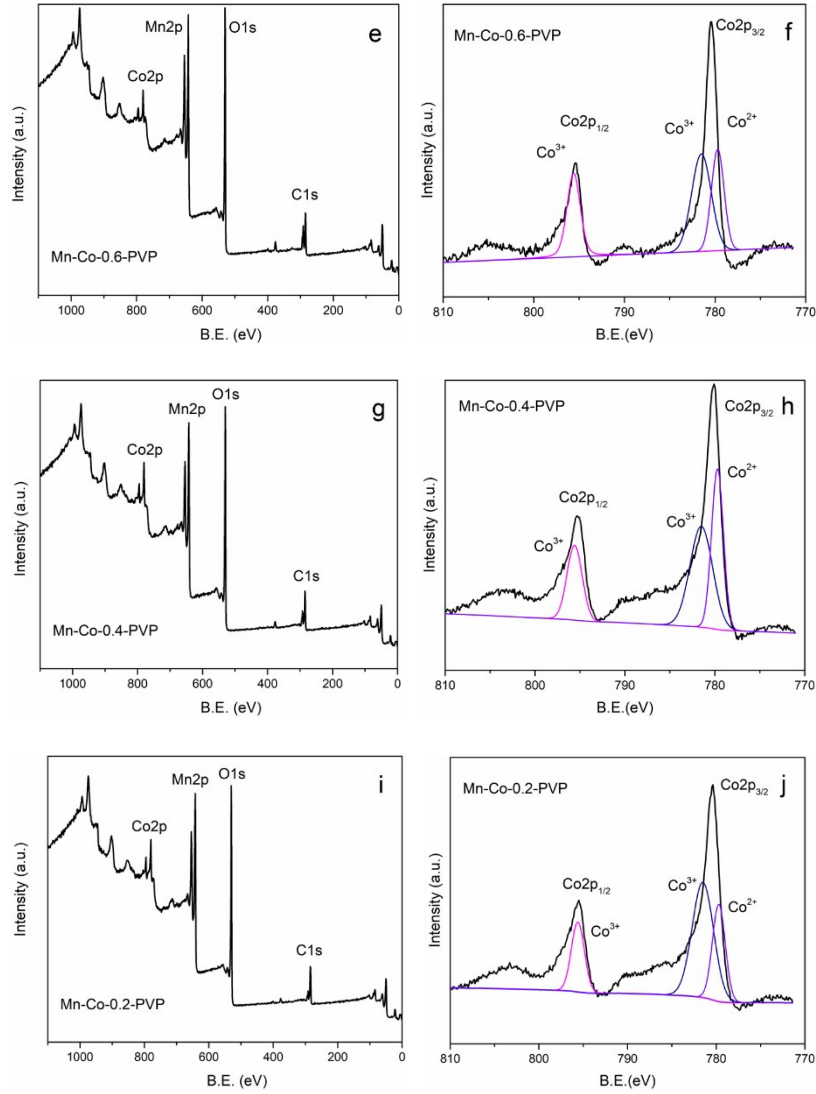


Figure S2. XPS spectra of Mn-Co-X-PVP catalysts with different Co contents: (a, c, e, g and i) Full spectra, (b, d, f, h and j) Co 2p XPS spectra.

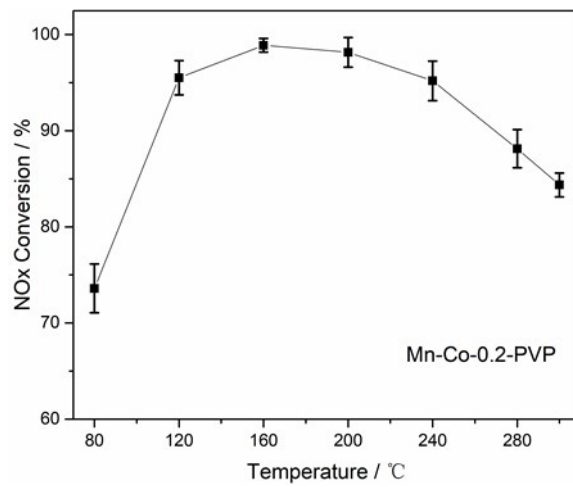


Figure S3. Repeated test and wrong bar of Mn-Co-0.2-PVP catalysts' low-temperature SCR catalytic performances.

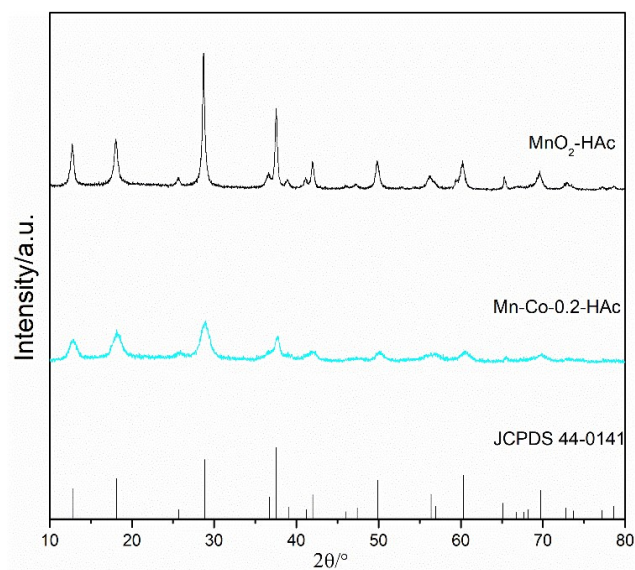


Figure S4. The XRD patterns of Mn-Co-0.2-HAc and MnO₂-HAc catalysts.

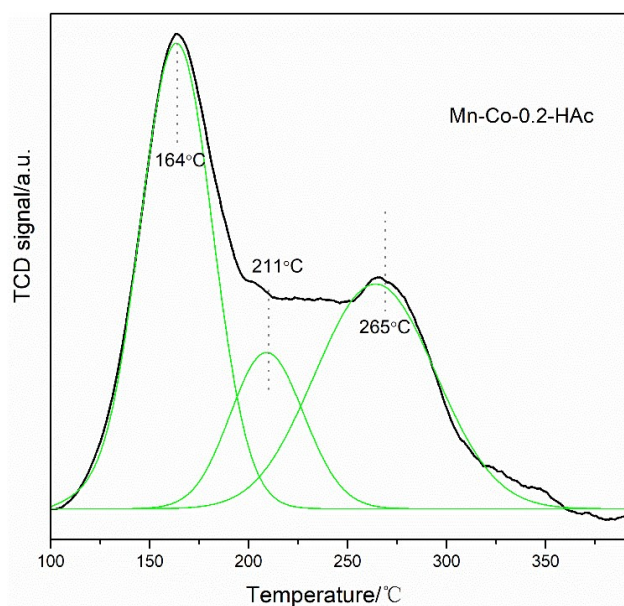


Figure S5. The NO-TPD profiles of Mn-Co-0.2-HAc catalysts.

Table S1. The textural properties of Mn-Co-X-PVP catalysts

Catalyst sample	S_{BET} (m ² /g)	V_{BJH} (cm ³ /g)	D_{BJH} (nm)
MnO ₂ -PVP	43.4	0.116	10.7
Mn-Co-0.9-PVP	32.4	0.062	7.6
Mn-Co-0.8-PVP	35.1	0.076	8.6
Mn-Co-0.6-PVP	49.3	0.100	8.1
Mn-Co-0.4-PVP	38.4	0.069	7.7
Mn-Co-0.2-PVP	40.0	0.074	7.4

Table S2. The crystalline particle size and the NH₃-TPD desorption peak areas of Mn-Co-0.2-HAc/PVP

Catalyst sample	Crystalline particle size (nm)	The NH ₃ -TPD desorption peak area (a.u./g)		
		~ 200°C	200~400°C	Total
Mn-Co-0.2-HAc	7.7	6.71	7.33	14.04
Mn-Co-0.2-PVP	10.2	3.28	3.86	7.14