Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Effects of Mn doping on electronic and quantum transport in $PbPdO_2$ thin films

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1. XRD of $PbPd_{1-x}Mn_xO_2$(x = 0, 0.05, 0.1, 0.15) powders.

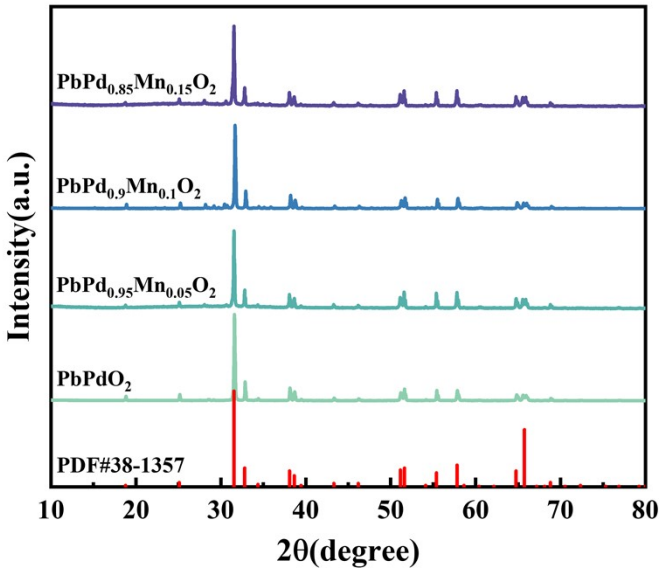

Fig. S1 X-ray diffraction (XRD) patterns of $PbPd_{1-x}Mn_xO_2$ (x = 0, 0.05, 0.1, 0.15) powders which is used to prepare PLD targets.

The XRD patterns of the powder accord with the standard spectrum of $PbPdO_2$ (PDF#38-1357) phase, indicating that we have successfully prepared $PbPd_{1-x}Mn_xO_2$(x = 0, 0.05, 0.1, 0.15) powders.

2. *In situ* XPS spectra of O 1s for $PbPd_{0.9}Mn_{0.1}O_2$ thin film.

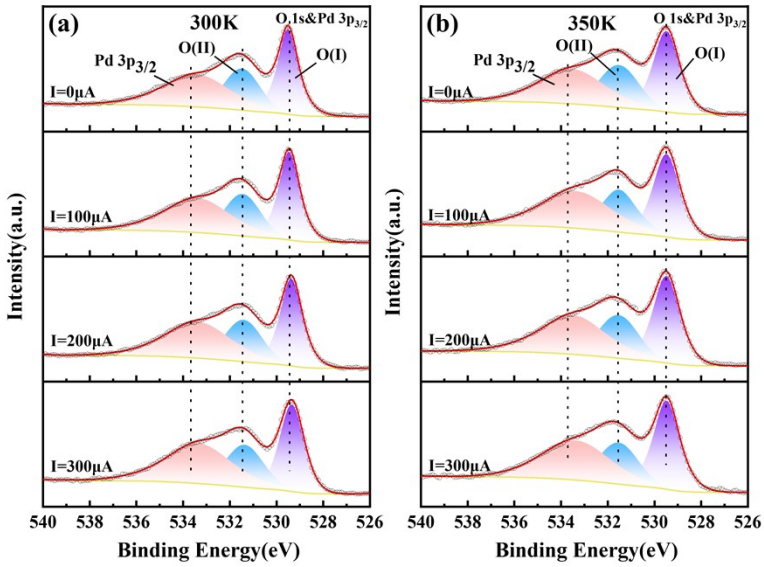

Fig. S2 *In situ* XPS spectra of O 1s of $PbPd_{0.9}Mn_{0.1}O_2$ thin film at 300 K (a) and 350 K (b) under I = 0, 100, 200, 300 μA.

Table S1 The percentage of the O(II) peak area (oxygen vacancy) to the total oxygen peak area (O(I)+O(II)) shown in Fig. S2.

Current	300 K	350 K
0μA	42.3%	42.6%
100μA	42.4%	41.8%
200μA	42.4%	40.9%
300μA	42.2%	39.7%

3. *In situ* XPS spectra of O 1s for $PbPd_{0.85}Mn_{0.15}O_2$ thin film.

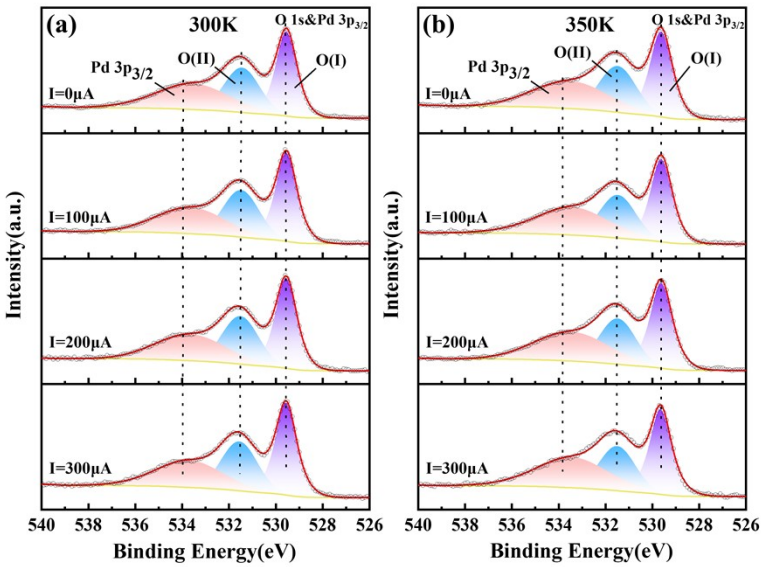

Fig. S3 *In situ* XPS spectra of O 1s of $PbPd_{0.85}Mn_{0.15}O_2$ thin film at 300 K (a) and 350 K (b) under I = 0, 100, 200, 300 μA.

Table S2 The percentage of the O(II) peak area (oxygen vacancy) to the total oxygen peak area (O(I)+O(II)) shown in Fig. S3.

Current	300 K	350 K
0μA	45.3%	45.3%
100μA	45.0%	44.6%
200μA	45.3%	44.2%
300μA	45.0%	43.8%

4. XPS spectra of Pb 4f, Pd 3d and Mn 2p for $PbPd_{1-x}Mn_xO_2$ thin film.

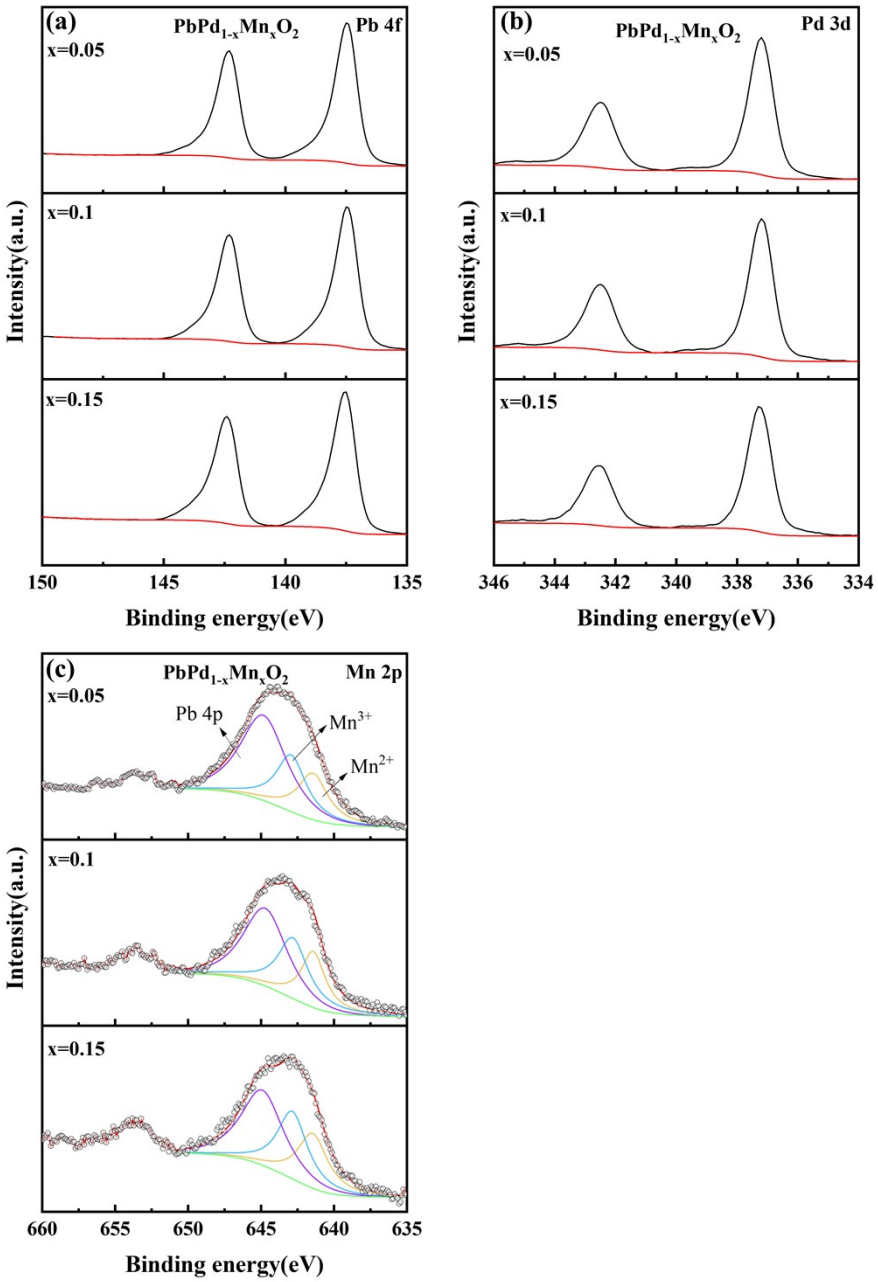

Fig. S4 XPS spectra of (a) Pb 4f, (b) Pd 3d and (c) Mn 2p for $PbPd_{1-x}Mn_xO_2$ (x=0.05, 0.1, 0.15) thin film.