Supporting information for:

Grain engineered polar-axis-oriented epitaxial $Mn_2Mo_3O_8$ films with higher magnetic transition temperature

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Table S1. Lattice constants of MMO films on YSZ(111) substrates.

Thickness (nm)	15	20	35	52	100	Bulk[1]
a (Å)	5.83	5.82	5.83	5.81	5.80	5.8003
c (Å)	10.25	10.22	10.21	10.17	10.19	10.2425

Table S2. Lattice constants, T_N and V_f for bulk MMO and MMO films deposited on Al_2O_3 and YSZ substrates.

	a (Å)	*c* (Å)	T_N (K)	V_f (%)
Bulk MMO	5.8003	10.2425	41	0
140-nm-thick MMO film on Al_2O_3 substrate	5.83	10.17	108	0
35-nm-thick MMO film on YSZ substrate	5.83	10.21	122	2
100-nm-thick MMO film on YSZ substrate	5.80	10.19	163	44

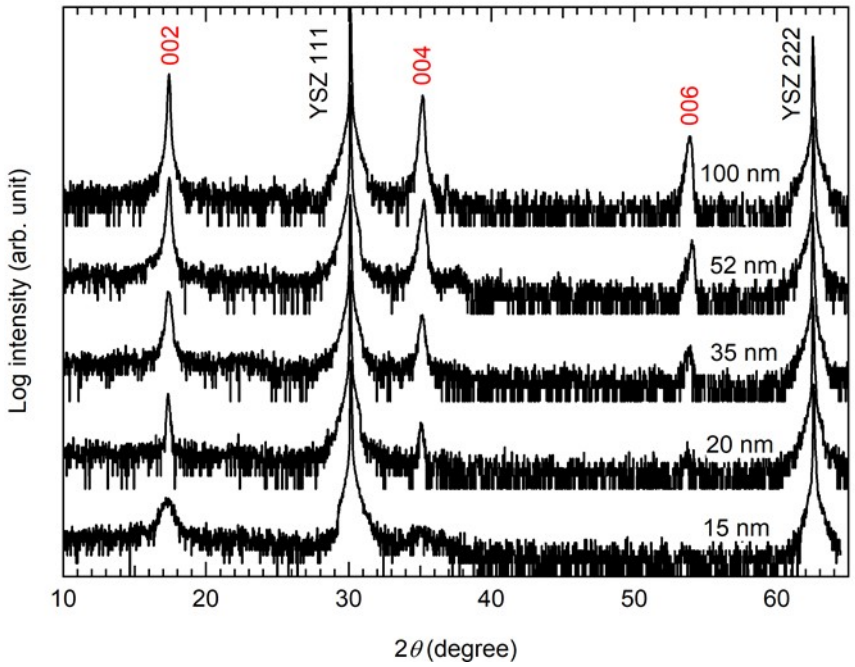

Figure S1. Out-of-plane $2\theta-\theta$ XRD patterns of the MMO films on YSZ(111) substrates.

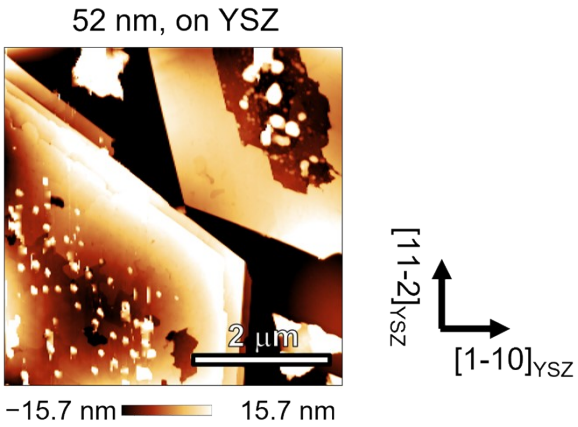

Figure S2. AFM image of the 52-nm-thick MMO film on YSZ(111) substrate.

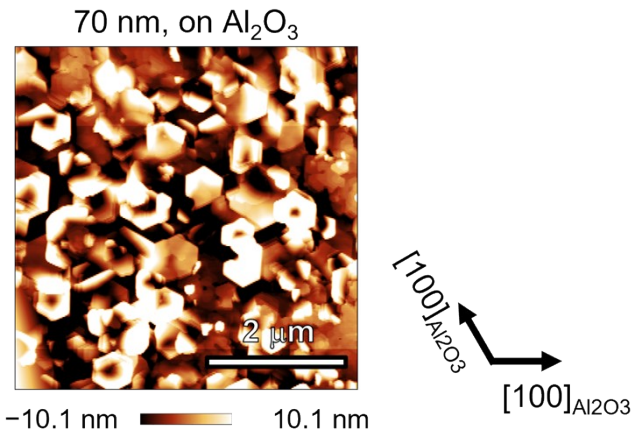

Figure S3. AFM image of the MMO film on Al_2O_3(001) substrate.

Reference

1 H. Abe, A. Sato, N. Tsujii, T. Furubayashi and M. Shimoda, *J. Solid State Chem.*, 2010, **183**, 379–384.