Electronic Supporting Information

Fabrication of pristine Mn_2O_3 and Ag-Mn_2O_3 composite thin films by AACVD for photoelectrochemical water splitting

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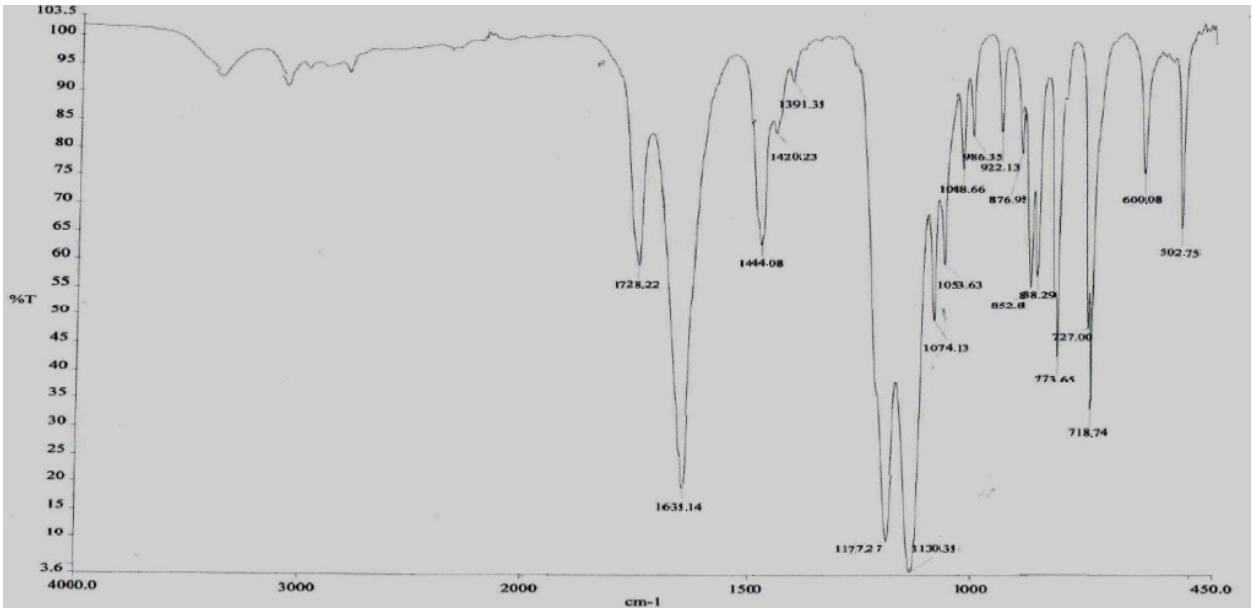
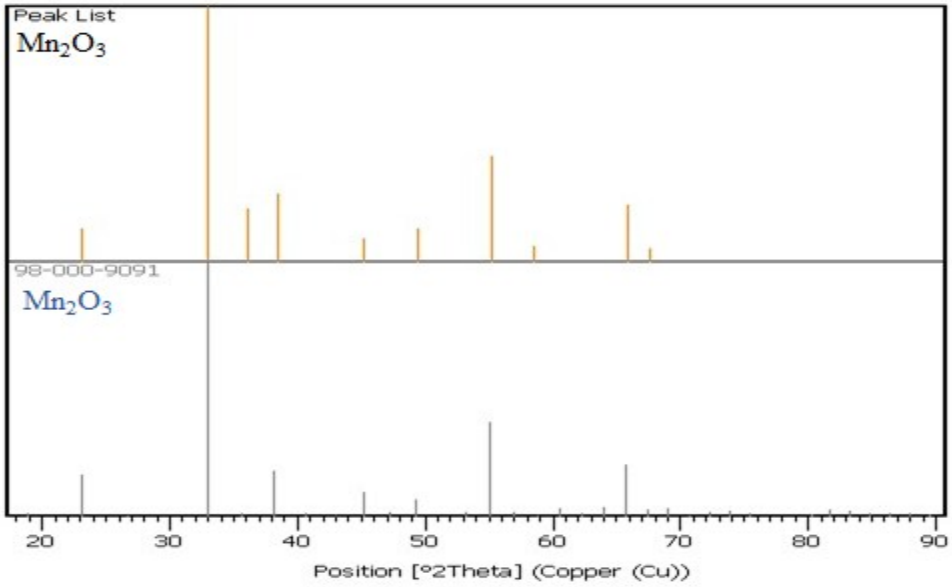
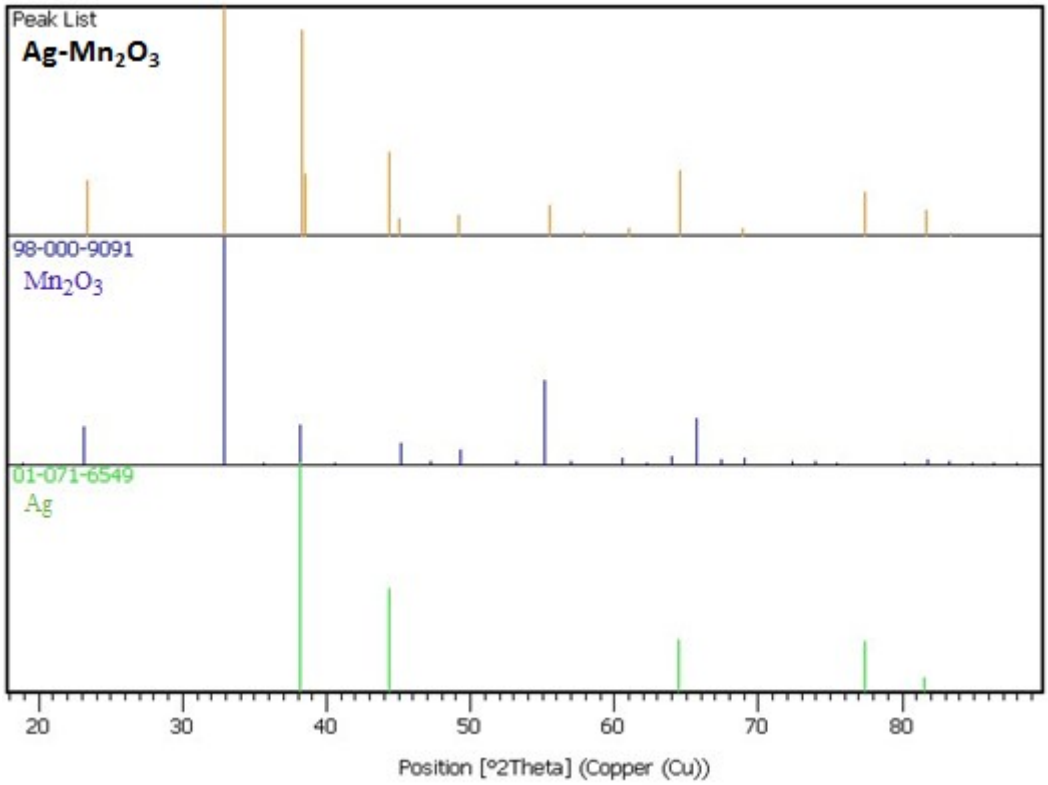


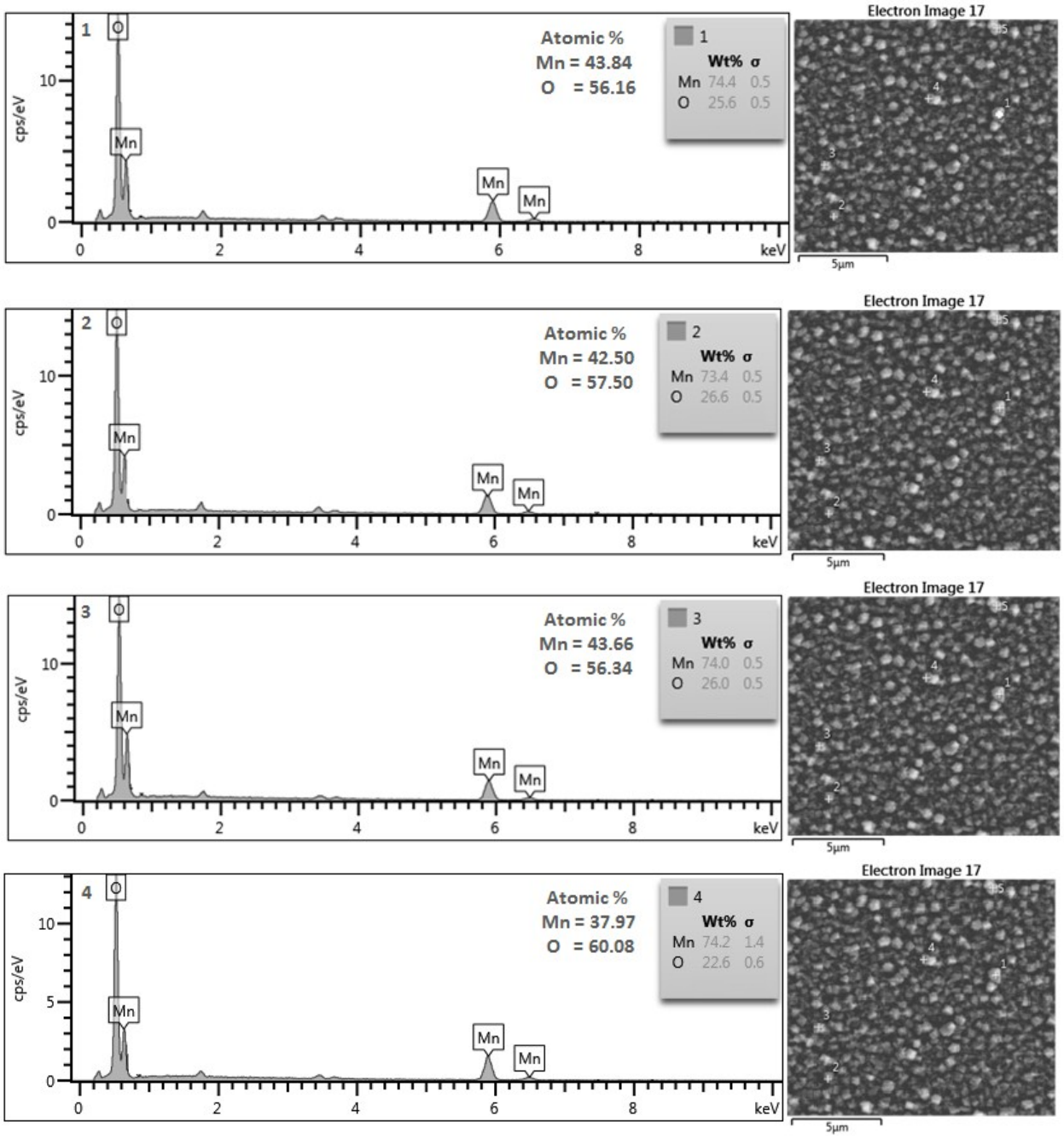
SI Fig.1: FT-IR spectrum $[Mn(dmaeH)_2(TFA)_4]$ **(1)**



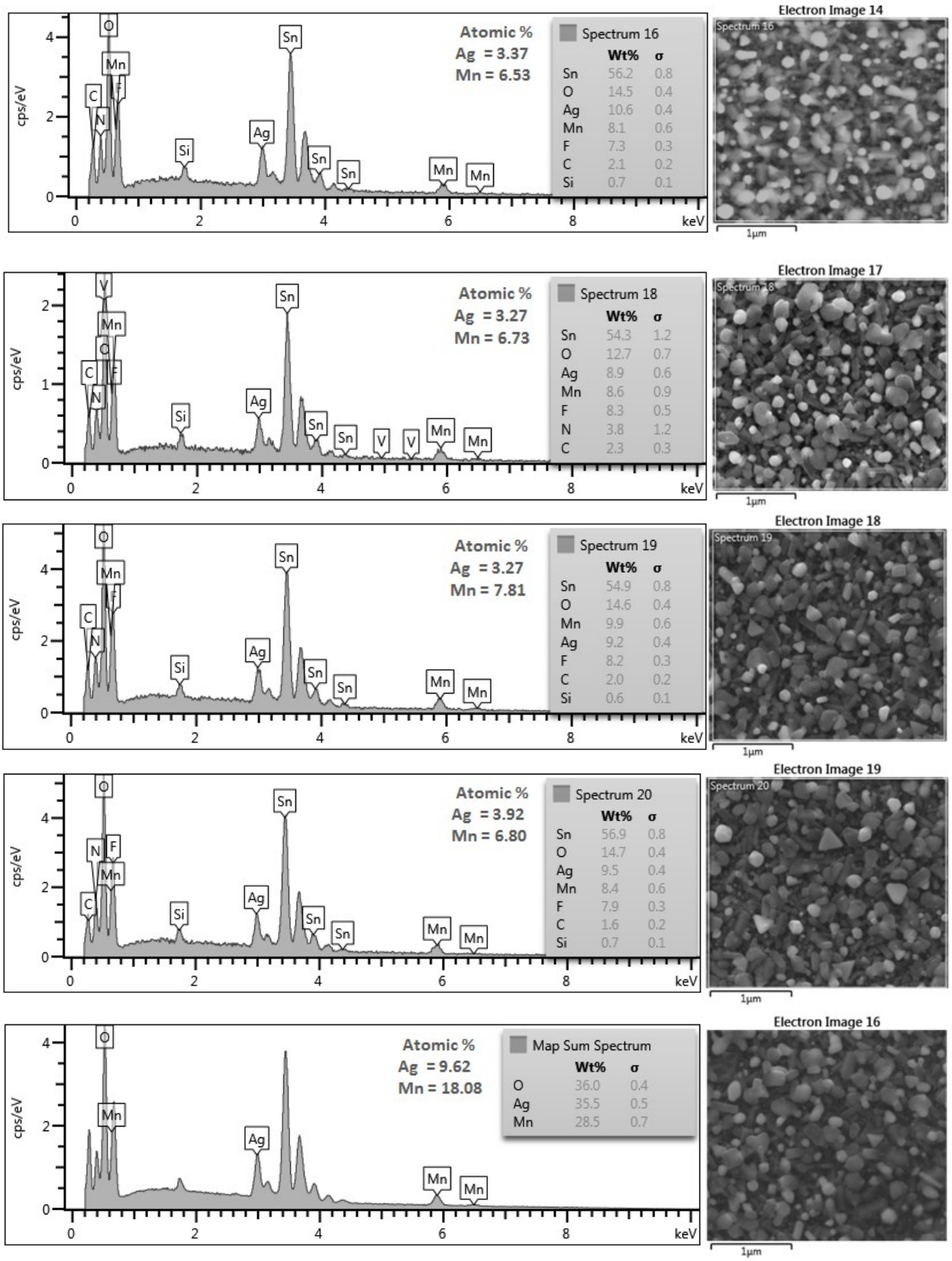
SI Fig.2a: Comparisons of XRD patterns of Mn_2O_3 thin film deposited from methanolic solution of (1) on crystalline FTO substrate with standard ICDD [98-000-9091].



SI Fig.2b: Comparisons of XRD patterns of Ag-Mn_2O_3 composite thin film deposited from a homogenous methanolic solution of (**1**) with Ag(CH_3COO) on crystalline FTO substrate with standard ICDD ; Mn_2O_3 (blue lines) (98-000-9091) and metallic Ag (green lines) (01-071-6549),



SI. Fig.3a: EDX of pristine Mn_2O_3



SI. Fig.3b: EDX of Ag-Mn_2O_3

Table S1. Crystal data and structure refinement for sad.

Identification code	sad	
Empirical formula	C16 H24 F12 Mn N2 O10	
Formula weight	687.31	
Temperature	114(2) K	
Wavelength	0.71073 Å	
Crystal system	Orthorhombic	
Space group	P b c a	
Unit cell dimensions	a = 9.0076(6) Å	α= 90°.
	b = 16.6072(12) Å	β= 90°.
	c = 18.0267(11) Å	γ = 90°.
Volume	2696.6(3) $Å^3$	
Z	4	
Density (calculated)	1.693 Mg/m^3	
Absorption coefficient	0.623 mm^{-1}	
F(000)	1388	
Crystal size	0.500 x 0.300 x 0.300 mm^3	
Theta range for data collection	3.197 to 28.694°.	
Index ranges	-8<=h<=11, -22<=k<=21, -20<=l<=24	
Reflections collected	13593	
Independent reflections	3427 [R(int) = 0.0350]	
Completeness to theta = 25.242°	99.8 %	
Absorption correction	"multi-scan"	
Max. and min. transmission	0.4329 and 0.3934	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	3427 / 51 / 207	
Goodness-of-fit on F^2	1.108	
Final R indices [I>2sigma(I)]	R1 = 0.0458, wR2 = 0.1153	
R indices (all data)	R1 = 0.0538, wR2 = 0.1211	
Extinction coefficient	n/a	
Largest diff. peak and hole	0.805 and -0.549 $e.Å^{-3}$	

Table S2. Selected Bond lengths [Å]

Mn(1)-O(3)#1	2.1065(15)
Mn(1)-O(3)	2.1065(15)
Mn(1)-O(5)	2.2005(14)
Mn(1)-O(5)#1	2.2005(14)
Mn(1)-O(1)#1	2.2175(14)
Mn(1)-O(1)	2.2175(14)

Table S 3. Selected bond angles [°]

O(3)#1-Mn(1)-O(3)	180.0
O(3)#1-Mn(1)-O(5)	89.15(6)
O(3)-Mn(1)-O(5)	90.85(6)
O(3)#1-Mn(1)-O(5)#1	90.85(6)
O(3)-Mn(1)-O(5)#1	89.15(6)
O(5)-Mn(1)-O(5)#1	180.0
O(3)#1-Mn(1)-O(1)#1	86.48(6)
O(3)-Mn(1)-O(1)#1	93.52(6)
O(5)-Mn(1)-O(1)#1	92.75(5)
O(5)#1-Mn(1)-O(1)#1	87.25(5)
O(3)#1-Mn(1)-O(1)	93.52(6)
O(3)-Mn(1)-O(1)	86.48(6)
O(5)-Mn(1)-O(1)	87.25(5)
O(5)#1-Mn(1)-O(1)	92.75(5)
O(1)#1-Mn(1)-O(1)	180.0