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Electronic Supplementary Information (ESI)

New Growth Modes of Molybdenum Oxide Layered 1D Structures using Alternative Catalysts: Transverse Mode vs. Axial Mode

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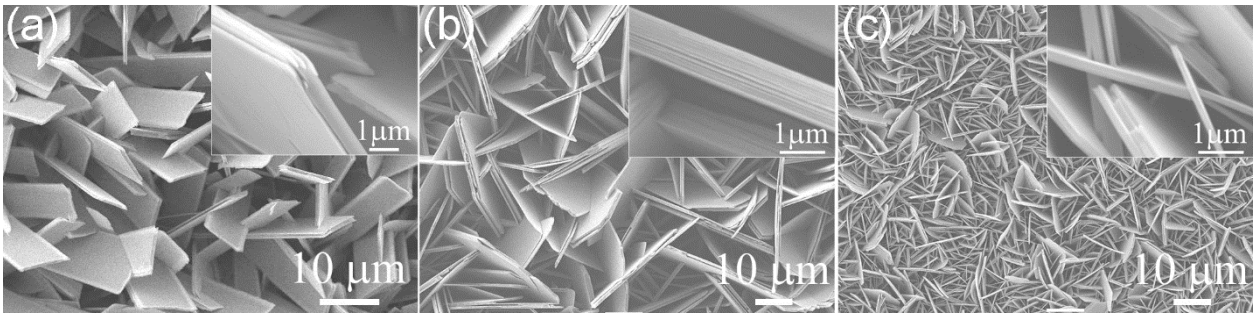

Fig. S1 SEM images of the MoO_3 nanoplates grown without any catalysts at different substrate temperatures: (a) 490 °C, (b) 445 °C, and (c) 340 °C.

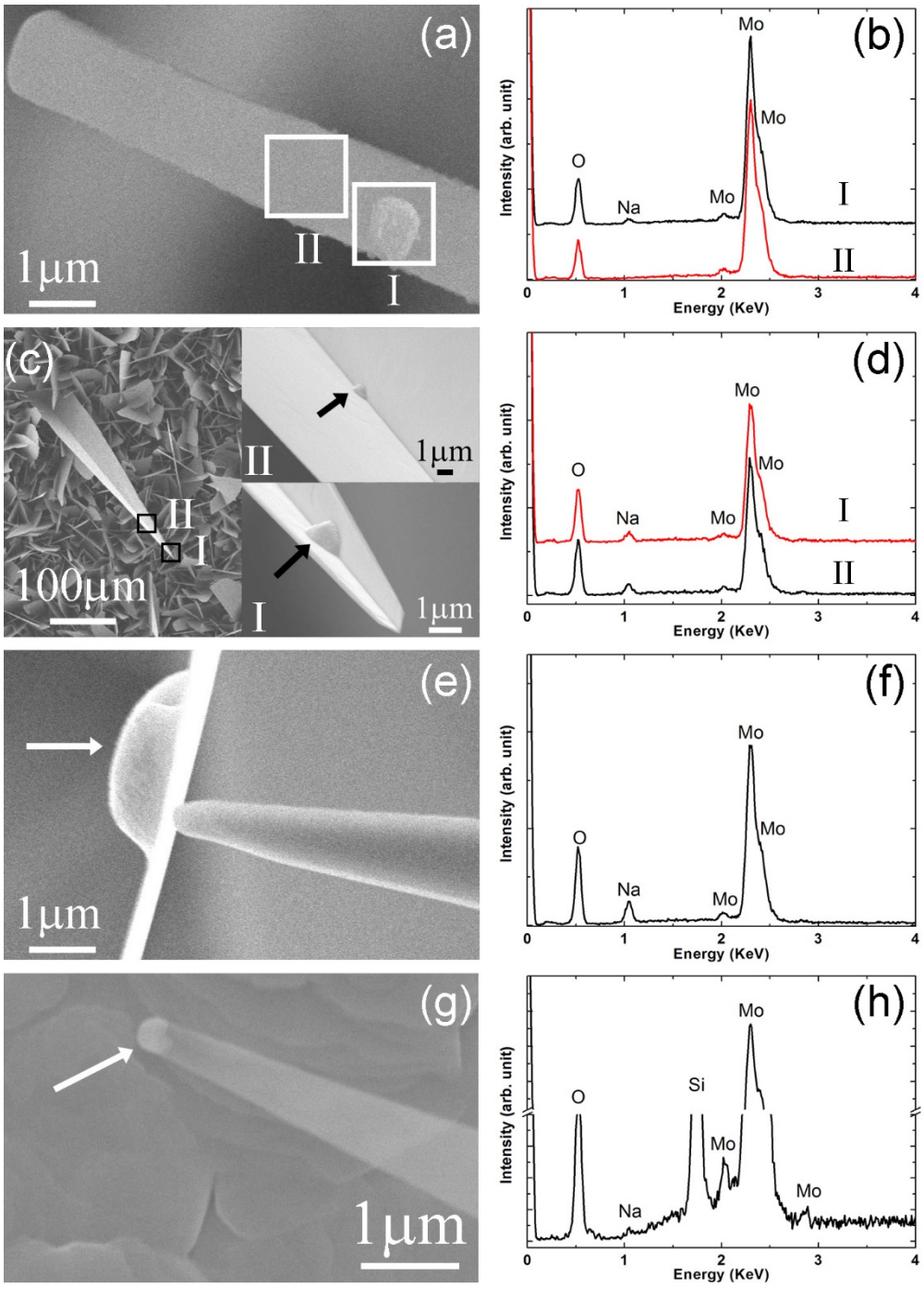

Fig. S2 SEM images and EDS spectra identifying the location, morphology, and composition of the catalyst particles on the nanobelt structures: (a-b) a catalyst particle (I) in the middle of a nanobelt (II), (c-d) two catalyst particles (I and II) leading the growth of two perpendicular nanobelts, (e-f) a catalyst particle in the middle of a nanobelt, and (g-f) a catalyst particle on the side surface of a nanobelt tip.

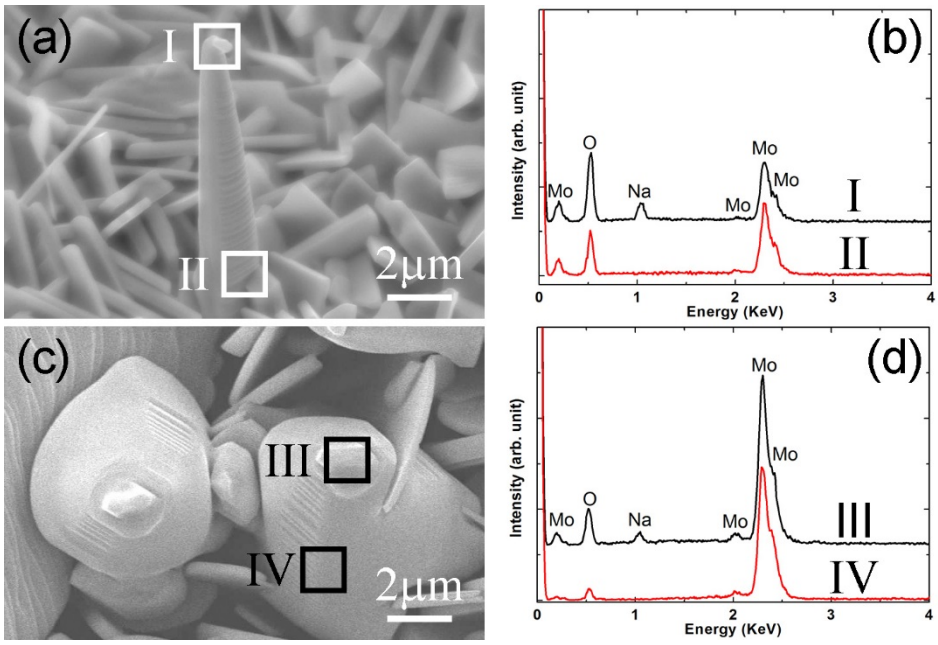

Fig. S3 SEM images and EDS spectra for identifying the location, morphology, and composition of the catalysts on the microtower structures: (a-b) a tiny catalyst particle (I) on top of a small cone shaped microtower (II), and (c-d) a catalyst particle (III) on a large and short microtower (IV).

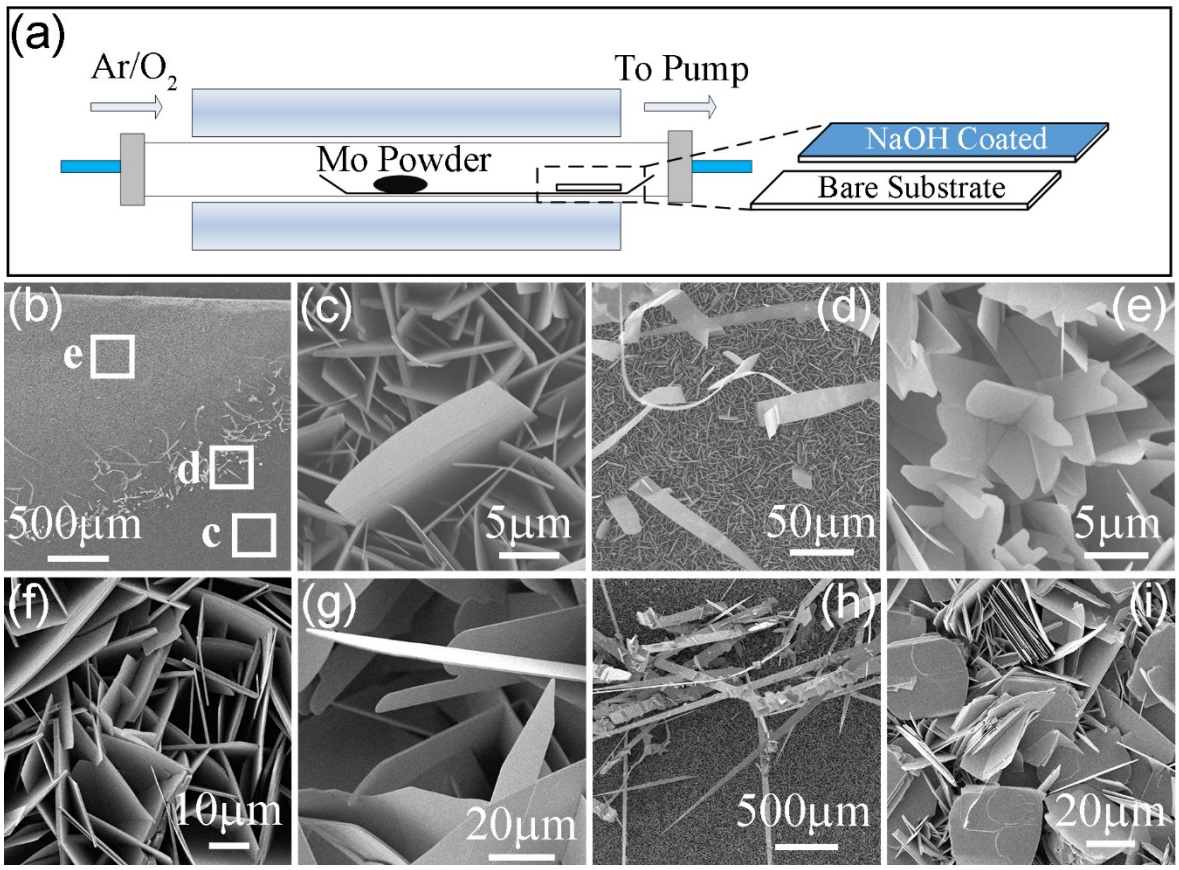

Fig. S4 "Side-by-side" growth proving the vapor-phase transport of catalysts during the growth. (a) Schematic drawing of the "side-by-side" growth with one NaOH catalysts treated substrate and one bare substrate without catalysts. SEM images of the growth on the untreated substrates at different growth times: (b-e) 30 min and (f-i) 120 min. For 30 min growth: (b) low magnification SEM image showing labeled growth areas with different morphologies, (c) rectangular nanoplates grown without catalysts, (d) nanobelts grown with catalysts, and (e) forked nanoplates grown with catalysts. For 120 min growth: (f) rectangular nanoplates without catalysts, (g) forked nanoplates with catalysts, (h) microbelts with catalysts, and (i) microtowers with catalysts.

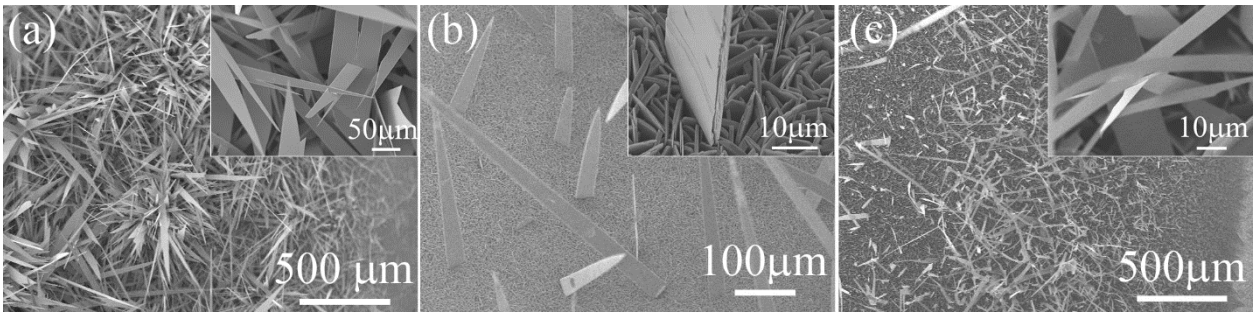

Fig. S5 SEM images of selected MoO_3 1D structures: (a) forked nanoplates grown with Na_2CO_3, (b) triangular microbelts grown on glass, and (c) nanobelts and microbelts grown on mica.

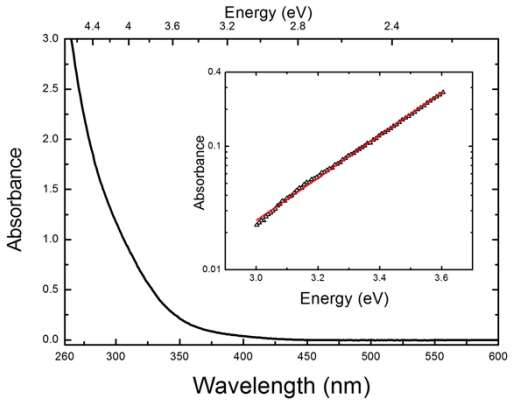

Fig. S6 Absorption spectrum of MoO_3 deposition. The inset shows the linear fitting of the absorbance at the absorption edge plotted logarithmically as a function of photon energy.

Table S1 Matching and comparison of Raman peaks (frequency, cm^{-1}) of sodium molybdates and molybdenum oxide with reported literatures.

$Na_2Mo_2O_7$			$Na_2Mo_4O_{13}$			MoO_3			
Saraiva et al.[1]	Fomichev et al.[2 a)]	Present work	Fomichev et al.[2]	Schofield [3 b)]	Present work	Eda[4]	Chu et al.[5]	Siciliano et al.[6]	Present Work
939	939/935	937		995	995	995	996	996	996
921	920/918	919	970	971	970	819	819	819	820
873	875/869	873	960	963	962	666	666	666	667
833	836/828	833	940			471	473		
821	818/815		925		926	378	378	379	380
768	774/765		910	918	915	366	365	365	364
741	741/739		895	899	898	338	337	336	338
524	526/525		870			291	291		291
467	464/460		835	841	841	283	283	284	284
413	411/411			820	819	246	244	246	245
369	369/368	366	745			217	218	216	216
339	340/336	340	650	666		197	197	198	199
295	296/294			620	619	159	158	158	156
249	245/245		438			129	129	129	
226	228/227	226			417	117	117	115	
	215/215		405			100	98		
200	199/199	198		396	393	84	84	82	
176			382	381					
137	140/138			368					
120	120/120		348						
84	84/84		335	339	336				
	45/44		320	320	318				
36			295	293					
			272		267				
			255						
				246					
			220	225	224				
				202					
				159	155				
				131					
				119					

[a)] For $^{92}Mo/^{100}Mo$ respectively; [b)] Read from the figure.

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