Formation Pathways of Lath-Shaped WO₃ Nanosheets and Elemental W Nanoparticles from Heating of WO₃ Nanocrystals Studied via In Situ TEM

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Supporting Table

Table S1. Structural details including lattice parameters of WO_x phases and of cubic W. The reference code specifies the JCPDS index.

Chemical	Reference	Crystal	Create another	Lattice parameters					
formula	code	system	Space grou	P a (Å)	b (Å)	c (Å)	α (°)	β (°)	γ (°)
WO ₃	00-041-0905	Cubic	Pm3m	3.71	3.71	3.71	90	90	90
WO ₃	00-043-1035	Monoclinic	P21/n	7.30	7.54	7.69	90	90.91	90
WO ₃	01-089-4479	Orthorhombic	Pbcn	7.36	7.57	7.76	90	90	90
WO ₃	00-005-0388	Tetragonal	P4/nmm	5.25	5.25	3.91	90	90	90
WO _{2.72}	01-073-2177	Monoclinic	P2/m	18.32	3.79	14.04	90	115.2	90
W	00-001-1203	Cubic	Im3m	3.15	3.15	3.15	90	90	90

Supporting Figures



Figure S1. TEM images demonstrating the influence of a high-intensity electron beam during imaging. Bright-field TEM images of WO₃ particles at 500 °C before (left) and after (right) high-intensity illumination by the electron beam.



Figure S2. SADPs of WO_x nanocrystals during heating up to 900 °C. Upon heating to 800 °C, the patterns corresponded to the cubic WO₃ crystal structure. The phase transformation to cubic W took place at 900 °C. At some areas where lath-shaped particles formed, the peaks corresponding to WO₃ (marked with yellow arrow in right-bottom image) remained at 900 °C.



Figure S3. (a)-(d) SADPs of the specimen heated from 800 °C to 875 °C. The blue arrow marks the ring corresponding to (111) reflection planes of WO₃ and the (110)-reflection of W, of which the intensity increased gradually. (e) integrated graphs of DPs in (a) to (d).



Figure S4. Bright-field TEM images of lath-shaped particles tilted to angles of $\pm 30^{\circ}$. The widths of the particles change with tilting, which indicates that particles are curled up, but not shaped as perfect cylinders.



Figure S5. STEM images of lath-shaped particles. (a) Bright-filed TEM image; (b) TEM image of the area marked with a white square in (a). Moiré patterns showing the multiple layers; (c) STEM image with the same magnification of (a); (d) STEM image with the same magnification as in (b).



Figure S6. Schematic structure of WO_{2.72} shown in different projections. (a) [010]-projection shown with polyhedral; (b) [106]-projection; (c) [$\overline{1}03$]-projection; (d) [$\overline{1}04$]-projection.