Supplementary materials

Facile Synthesis of Various Epitaxial and Textured Polymorphs of Vanadium Oxide Thin films on the (0006)-surface of Sapphire Substrates

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1 The prices of the listed substrates for the growth of VO_2 thin films

Here, we listed the prices some typical sing crystal substrates used to fabrication epitaxial VO_2 thin films in Table-S1. The sapphire substrates is cheaper than the others (http://www.mtixtl.com/).

In addition, the sapphire substrate is so transparent in ultraviolet, visible and infrared regions that it can be used to design optoelectronic devices based on the VO_2 thin films. The other substrates cannot give this advantages.

Table-S1. The cost of typical single crystal substrates (data from MTI Corporation)

Substrates	*Size*	*Price(USD) @MTI Corporation*
Al_2O_3	**1''×0.5mm**	**85.95**
$LaAlO_3$	1''×0.5mm	99.00
$(LaAlO_3)_{0.3}(SrAl_{0.5}Ta_{0.5}O_3)_{0.7}$	1''×0.5mm	259.95
MgO	1''×0.5mm	290.00
$SrTiO_3$	1''×0.5mm	368.00
TiO_2	10×10×0.5mm	135.00

2 The XRD patterns for the VO_x thin films

To better learn the purities and orientations of the different crystalline phases, the full XRD pattern scans of (a) VO_2 (B), (b) VO_2 (M1), (c) VO_2 (M1+B), and (d) VO_2 (M1+mM) from 10°-95° were performed and the corresponding results are shown in Figure-S1 (a), (b), (c) and (d).

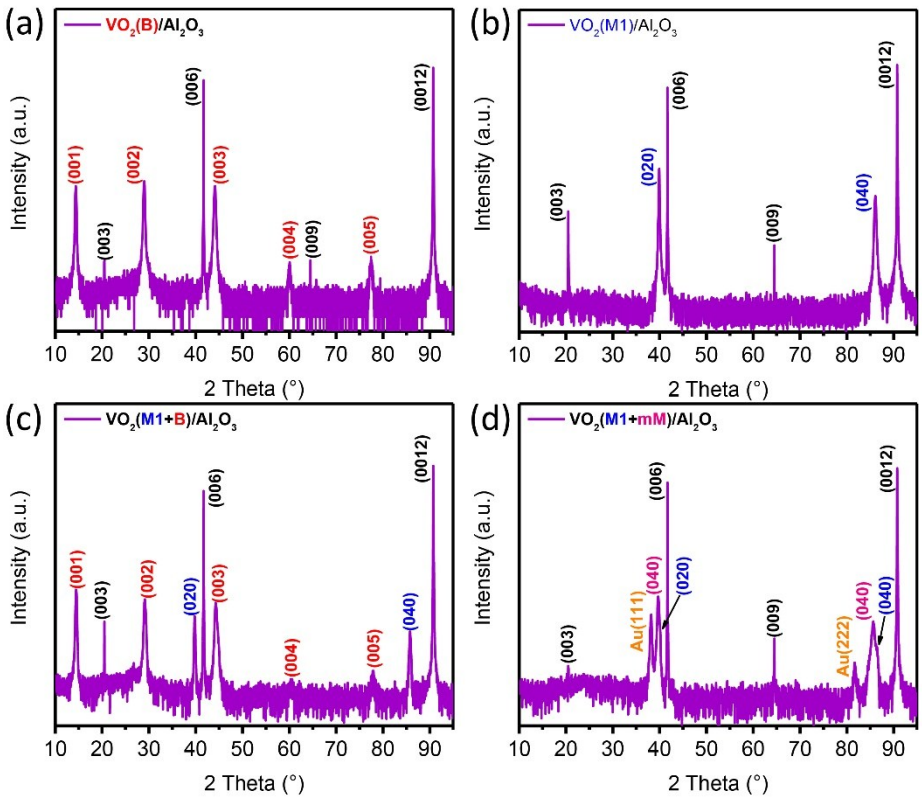

Figure S1. The full XRD pattern scans of (a) VO_2 (B), (b) VO_2 (M1), (c) VO_2 (M1+B), and (d) VO_2 (M1+mM) from 10°-95°.

3 Determination of the film thicknesses

In this work, we used X-ray reflectivity (XRR) technique to check the thicknesses of the vanadium oxide thin films non-destructively. As shown in Figure S2, X-Ray reflectivity curve for the one of the vanadium oxide thin films was used to calculate the film thickness *d* with formula: $d = \frac{(m-n)\lambda}{2(Sin\theta_m - Sin\theta_n)}$, the thickness is ~ 120 nm. Therefore, by repeating this measurement several times with different deposition time, the relationship of the film thickness vs. deposition time is plotted and thus the film thickness what you want is easily obtained.

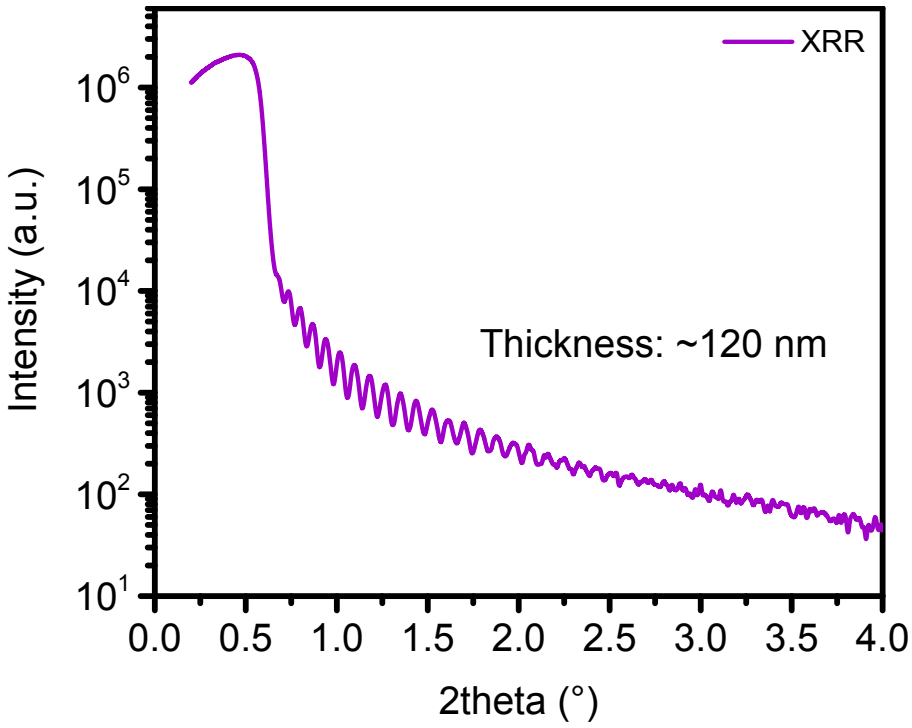

Figure S2. Measured X-Ray reflectivity curve for one of the vanadium oxide thin films, and we can calculate the film thickness *d* is about 120 nm.