

## Electronic Supporting Information

### Hydrothermal epitaxy growth of self-organized vanadium dioxide 3D structures with metal-insulator transition and THz transmission switch properties

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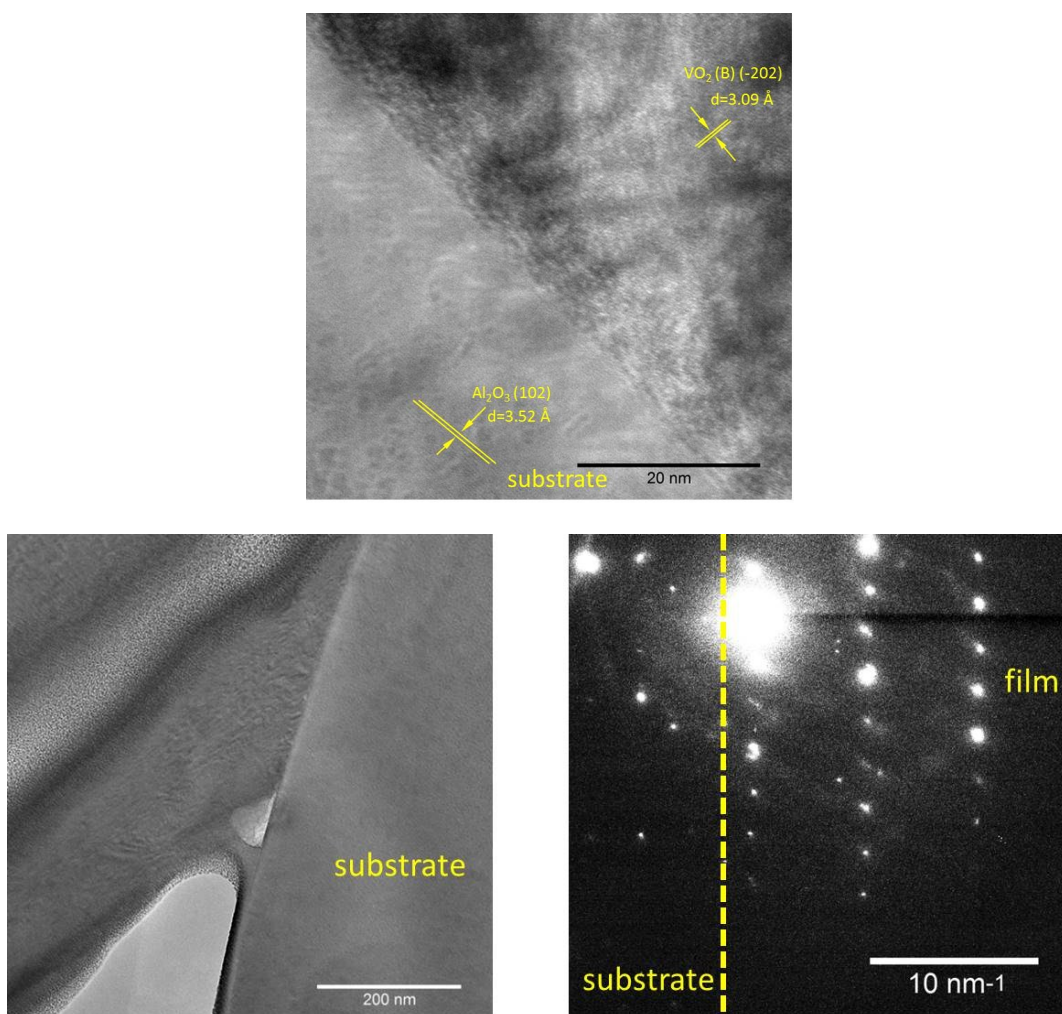


Figure S1. HRTEM, TEM and related SAED Images of  $\text{VO}_2(\text{B})$  film on R-sapphire substrate (Epitaxial relations for  $\text{VO}_2(\text{B})$   $(-202)_f \perp (01-12)_s$ , s-substrate, f-film ). Cross section of sample were realized perpendicularly to substrate and along the axis of carambola-growth

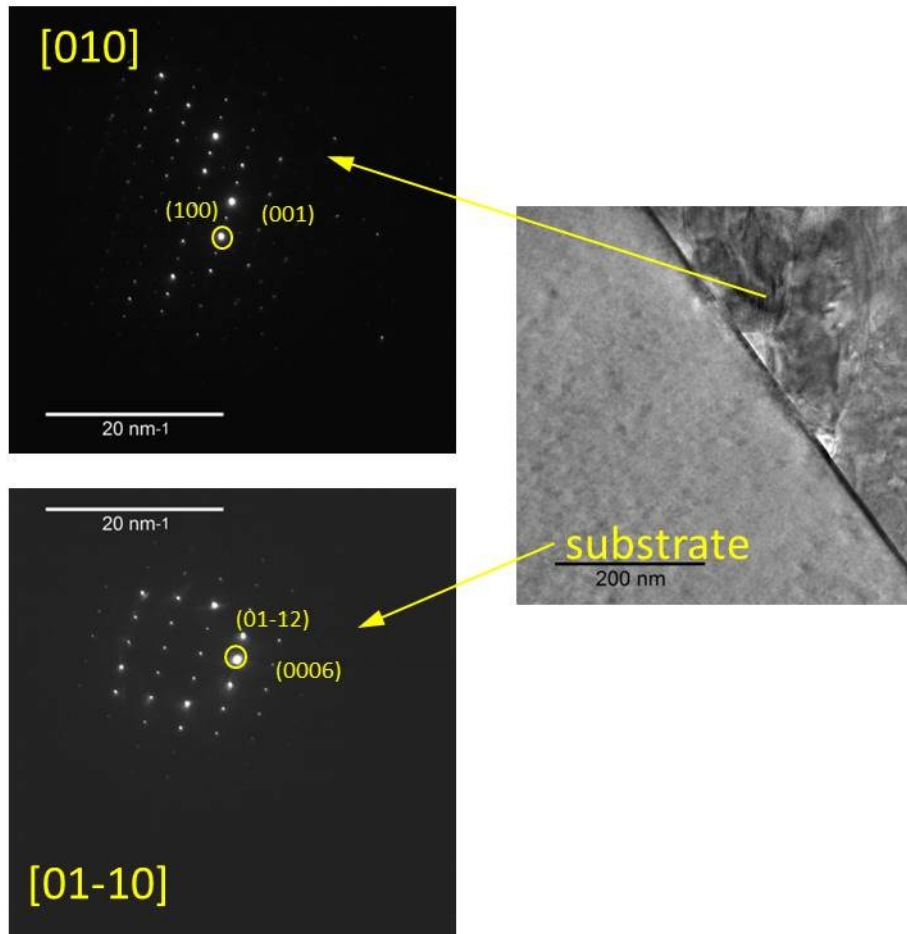


Figure S2. SAED Patterns and TEM Image of  $\text{VO}_2(\text{M})$  film on R-sapphire substrate (Epitaxial relations for  $\text{VO}_2(\text{M})$   $(001)_f \parallel (0001)_s$ ,  $(100)_f \parallel (01-12)_s$ ,  $[010]_f \parallel [01-10]_s$ ).

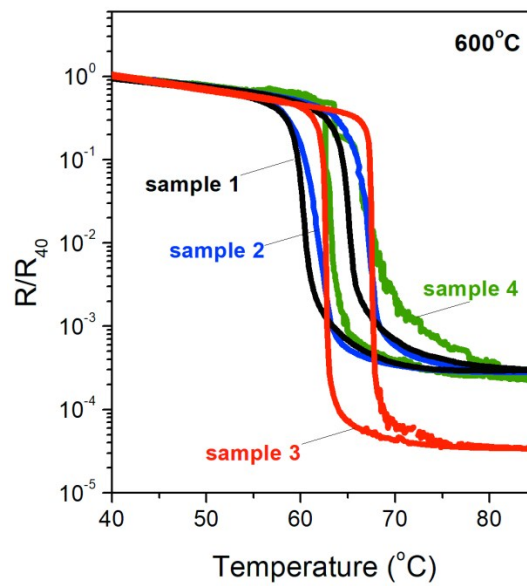


Figure S3. The electrical properties of all samples annealed at  $600^\circ\text{C}$ .