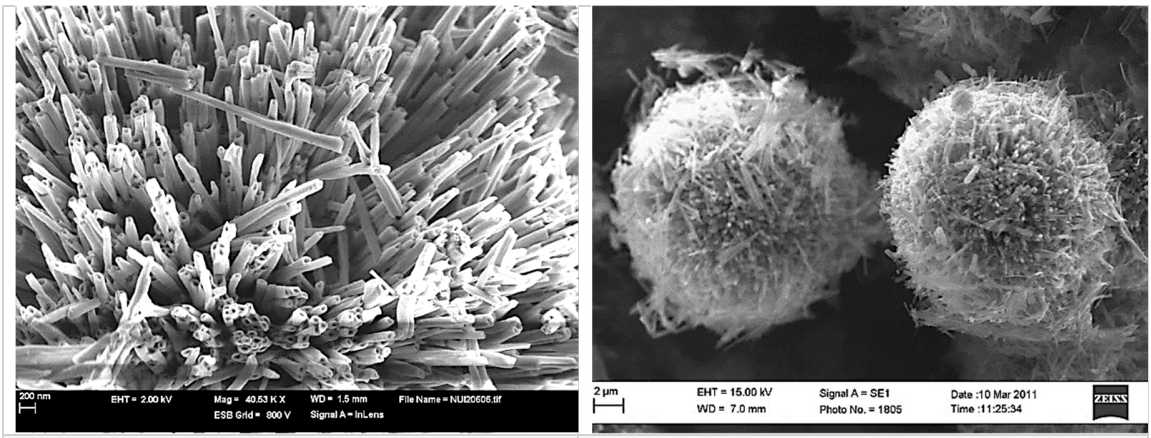
Supplementary Information

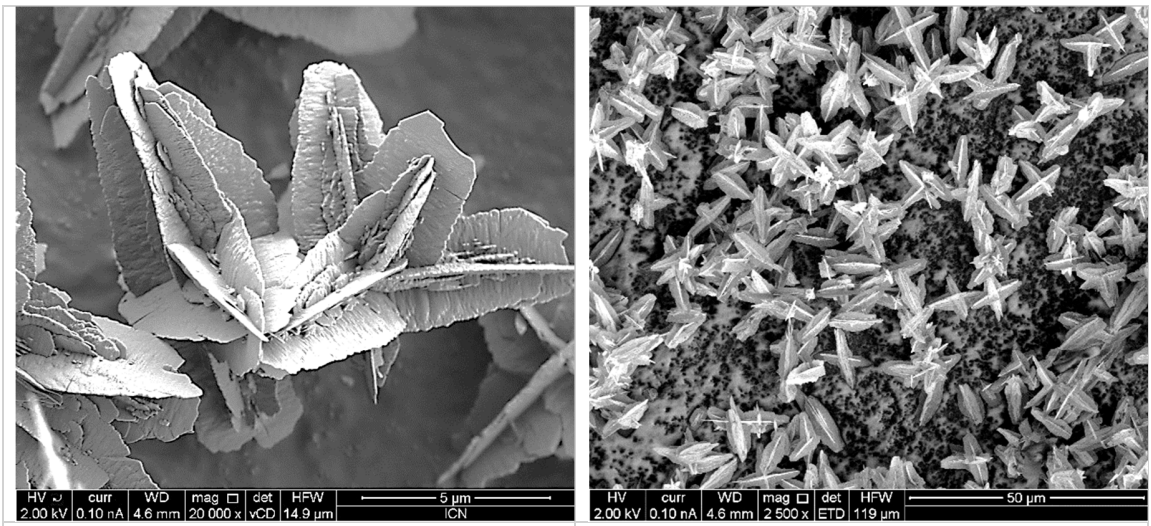
Figure S1. SEM Micrographs VOx – NU



(a) **(b)**

Figure S1. SEM micrographs of vanadium oxide $(C_{18}H_{37}NH_3)_2V_7O_{16}$ high-density VOx-NTs radial array spherical clusters (nanourchins, VOx-NU): (**a**) VOx-NTs radial array from the urchin surface; (**b**) isolated urchins spherical clusters.

Figure S2. SEM Micrographs VOx-MC



(a) **(b)**

Figure S2. SEM micrographs of vanadium oxide VO_2 micro- crosses (VOx-MC): (**a**) detailed VOx-MC VO_2 folds; **(b)** long scan clustered micro-crosses.

Figure S3. TEM micrographs VOx-MC

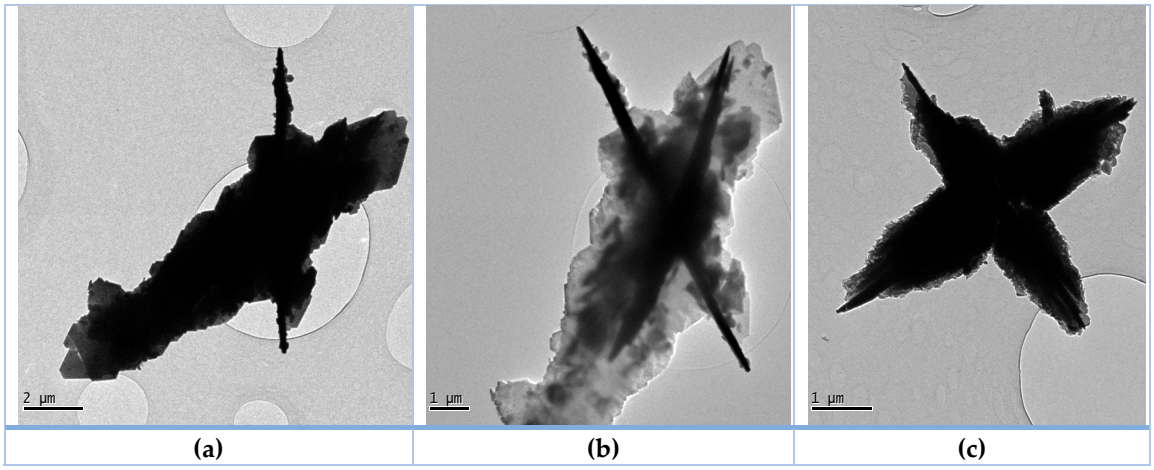


Figure S3. TEM micrographs of vanadium oxide VO_2 micro- crosses (VOx-MC): (**a-b**) detailed VOx-MC VO_2 folds; **(c)** isolated VOx-MC exhibiting the VO_2 four folds.

Figure S4. SEM Micrographs VOx-MC

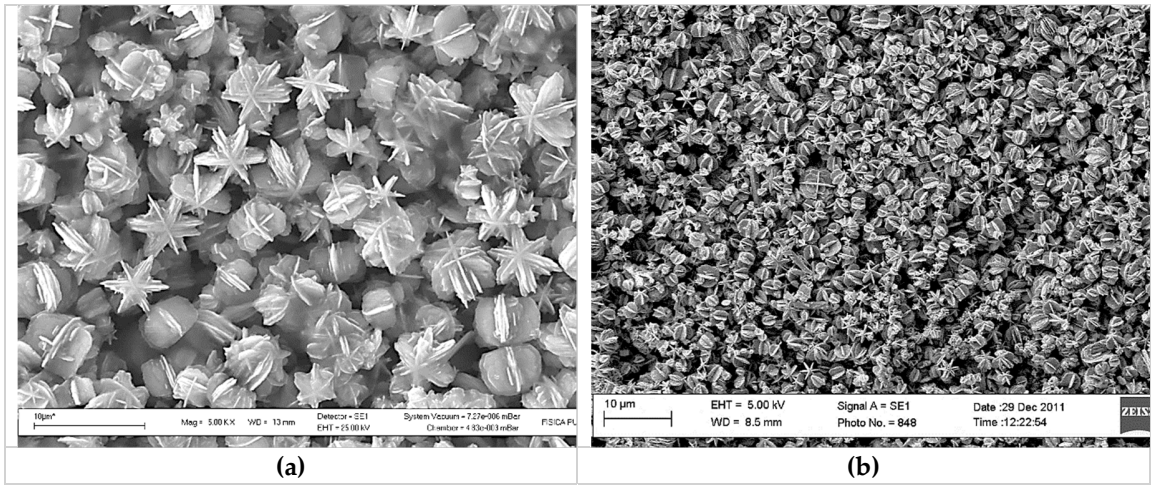
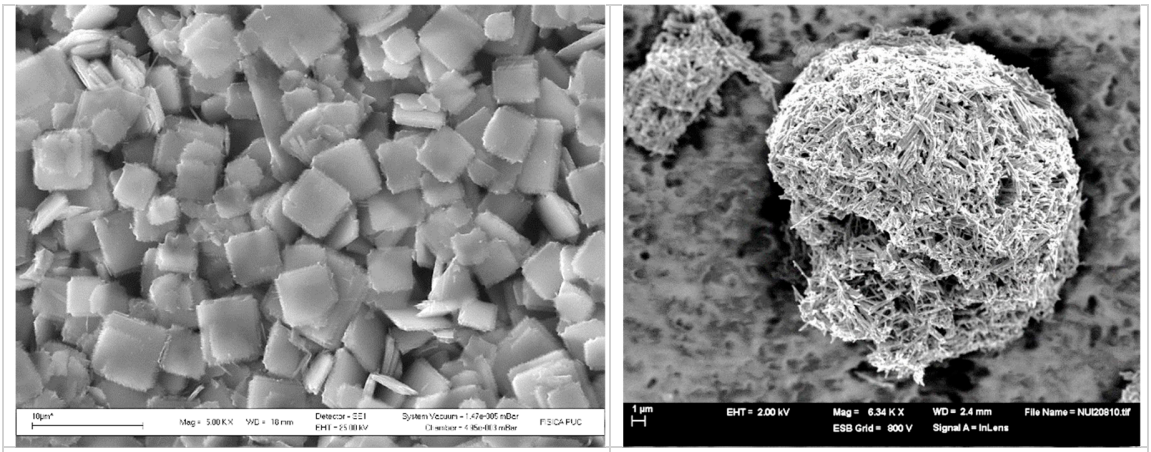


Figure S4. SEM micrographs of vanadium oxide V_6O_{11} rotationally symmetric six-folds (VOx-NC): (**a**) vanadium oxide six-folds, star-fruit morphology; (**b**) long scan clustered V_6O_{11} vanadium oxide six-folds.

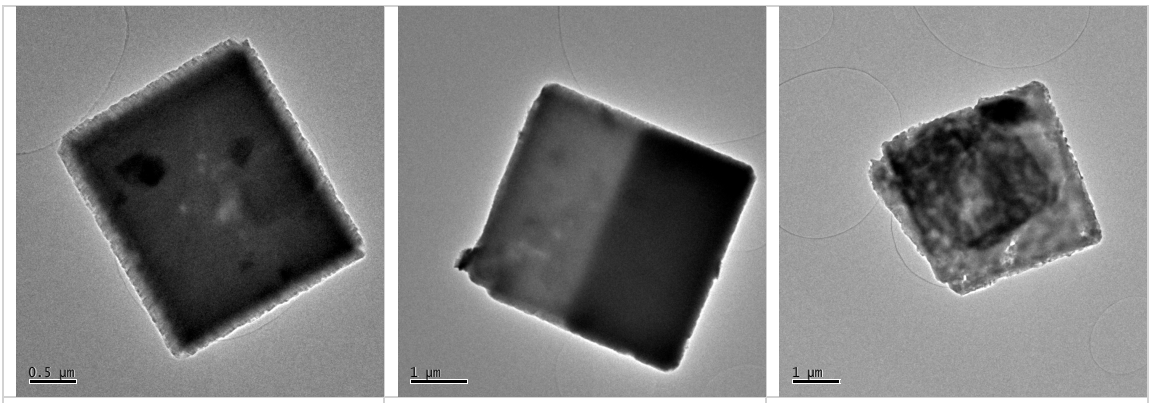
Figure S5. SEM Micrographs of defect VOx-MSQ and VOx-NU



(a) **(b)**

Figure S5. SEM micrographs of defected vanadium oxide $(NH_4)_2V_7O_{16}$ micro-squares (VOx-MSQ): (**a**) long scan of clustered and eroded VOx-MSQ featuring borders with high porosity degree; (**b**) cracked $(C_{18}H_{35}NH_3)_2V_7O_{16}$ nanourchins (VO_x-NU).

Figure S6. TEM Micrographs of defect VOx-MSQ



(a) **(b)** **(c)**

Figure S6. TEM micrographs of defected vanadium oxide $(NH_4)_2V_7O_{16}$ micro-squares (VOx-MSQ): (**a-b**) isolated eroded VOx-MSQ featuring borders with high porosity degree; (**c**) defect rich VOx-MSQ eroded with high porosity degree.