Supporting Information for

Synthesis, Structure, and Characterization of Novel Two- and Three-Dimensional Vanadates:

$\text{Ba}_{2.5}(\text{VO}_2)_3(\text{SeO}_3)_4\cdot\text{H}_2\text{O}$ and $\text{La}(\text{VO}_2)_3(\text{TeO}_6)_3\cdot3\text{H}_2\text{O}$

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Figure S1. ORTEP representation (50 % probability ellipsoids) of $\text{Ba}_{2.5}(\text{VO}_2)_3(\text{SeO}_3)_4\cdot\text{H}_2\text{O}$

Figure S2. ORTEP representation (50 % probability ellipsoids) of $\text{La}(\text{VO}_2)_3(\text{TeO}_6)_3\cdot3\text{H}_2\text{O}$

Figure S3. ORTEP representation of 12- and 8-membered rings in $\text{Ba}_{2.5}(\text{VO}_2)_3(\text{SeO}_3)_4\cdot\text{H}_2\text{O}$. 50% probability ellipsoids (O in red, V in blue, and Se in green) are depicted. Note the 12-membered rings are in eclipsed conformation.

Figure S4. ORTEP representation of the TeO$_6$ and VO$_4$ polyhedra in $\text{La}(\text{VO}_2)_3(\text{TeO}_6)_3\cdot3\text{H}_2\text{O}$. 50% probability ellipsoids (O in red, V in blue, and Te in green) are depicted. Note that each TeO$_6$ polyhedron is surrounded by six VO$_4$ tetrahedra.

Figure S5. Calculated (a) and observed (b) powder X-ray diffraction (XRD) patterns for $\text{Ba}_{2.5}(\text{VO}_2)_3(\text{SeO}_3)_4\cdot\text{H}_2\text{O}$. XRD pattern for anhydrous $\text{Ba}_{2.5}(\text{VO}_2)_3(\text{SeO}_3)_4$, obtained by dehydration of $\text{Ba}_{2.5}(\text{VO}_2)_3(\text{SeO}_3)_4\cdot\text{H}_2\text{O}$ at 340 °C for 1h, is shown in the top panel (c).
**Figure S6.** Powder X-ray diffraction patterns for (a) La(VO₂)₃(TeO₆).3H₂O (calculated) (b) La(VO₂)₃(TeO₆).3H₂O (observed) (c) anhydrous La(VO₂)₃(SeO₆), obtained by dehydration of La(VO₂)₃(SeO₆).3H₂O at 350 ºC, and (d) products obtained by calcining La(VO₂)₃(SeO₆).3H₂O at 600 ºC showing LaVO₄ is the major phase.

**Table S1.** Powder XRD data (indexing using PROSZKI program) for anhydrous La(VO₂)₃(SeO₆)

**Figure S7.** IR spectra for Ba₂.₅(VO₂)₃(SeO₃)₄.H₂O

**Figure S8.** IR spectra for La(VO₂)₃(SeO₆).3H₂O

**Figure S9.** Raman spectra for (a) Ba₂.₅(VO₂)₃(SeO₃)₄.H₂O, and (b) La(VO₂)₃(SeO₆).3H₂O

**Figure S10.** Diffuse reflectance spectra for Ba₂.₅(VO₂)₃(SeO₃)₄.H₂O, and La(VO₂)₃(SeO₆).3H₂O

**Figure S11.** Thermogravimetric analysis curve for Ba₂.₅(VO₂)₃(SeO₃)₄.H₂O

**Figure S12.** Nitrogen Adsorption Isotherm and BET plot for Ba₂.₅(VO₂)₃(SeO₃)₄.

**Figure S13.** Thermogravimetric analysis curve for La(VO₂)₃(SeO₆).3H₂O
**Figure S1.** ORTEP representation (50 % probability ellipsoids) of Ba$_{2.5}$(VO$_2$)$_3$(SeO$_3$)$_4$.H$_2$O
Figure S2. ORTEP representation (50 % probability ellipsoids) of La(VO$_2$)$_3$(TeO$_6$)$_3$H$_2$O
Figure S3. ORTEP representation of 12- and 8-membered rings in Ba$_{2.5}$(VO$_2$)$_3$(SeO$_3$)$_4$.H$_2$O. 50% probability ellipsoids (O in red, V in blue, and Se in green) are depicted. Note the 12-membered rings are in eclipsed conformation.
Figure S4. ORTEP representation of the TeO$_6$ and VO$_4$ polyhedra in La(VO$_2$)$_3$(TeO$_6$)$_3$H$_2$O. 50% probability ellipsoids (O in red, V in blue, and Te in green) are depicted. Note that each TeO$_6$ polyhedron is surrounded by six VO$_4$ tetrahedra.
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$^1$JCPDS card no. 70-0216
**Table S1.** Powder XRD data (indexing using PROSZKI\textsuperscript{1} program) for anhydrous La(VO\textsubscript{2})\textsubscript{3}(TeO\textsubscript{6})

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*Space group R3\textsubscript{c}; a = b = 9.256(5) Å, c = 22.79(2) Å and V = 1691(2) Å\textsuperscript{3}.

Figure S7. IR spectra for Ba$_{2.5}$(VO$_2$)$_3$(SeO$_3$)$_4$.H$_2$O

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Figure S12. Nitrogen Adsorption Isotherm and BET plot for Ba$_{2.5}$(VO$_2$)$_3$(SeO$_3$)$_4$. 

- Isotherm
- BET Plot
- Y-Intercept = 4.071
- Surface area = 2.07 m$^2$/g
Figure S13. Thermogravimetric analysis curve for La(VO₂)₃(TeO₆).3H₂O