# Electronic Supplementary Information (ESI)

# Valence-to-core X-ray Emission Spectroscopy of Vanadium Oxide and Lithiated Vanadyl Phosphate Materials

Evan P. Jahrman[1](ж), William M. Holden[1], Niranjan Govind[2](†), Joshua J. Kas[1], Jatinkumar Rana[3], Louis F. J. Piper[3,4], Carrie Siu[5], M. Stanley Whittingham[5], Timothy T. Fister[6], and Gerald T. Seidler[1](‡)

[1]Physics Department, University of Washington, Seattle, WA 98195-1560, United States
[2]Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory, Richland, WA 99354, United States
[3]Physics Department, Binghamton University, State University of New York, Binghamton, New York 13850, United States
[4]Materials Science and Engineering, Binghamton University, State University of New York, Binghamton, New York 13850, United States
[5]NorthEast Center for Chemical Energy Storage, Binghamton University, State University of New York, Binghamton, New York 13850, United States
[6]Chemical Sciences and Engineering Division, Argonne National Laboratory, Lemont, IL 60439, United States

(ж) evan.jahrman@nist.gov - author is currently at the National Institute of Standards and Technology in Gaithersburg, MD ; (†) niri.govind@pnnl.gov ; (‡) seidler@uw.edu

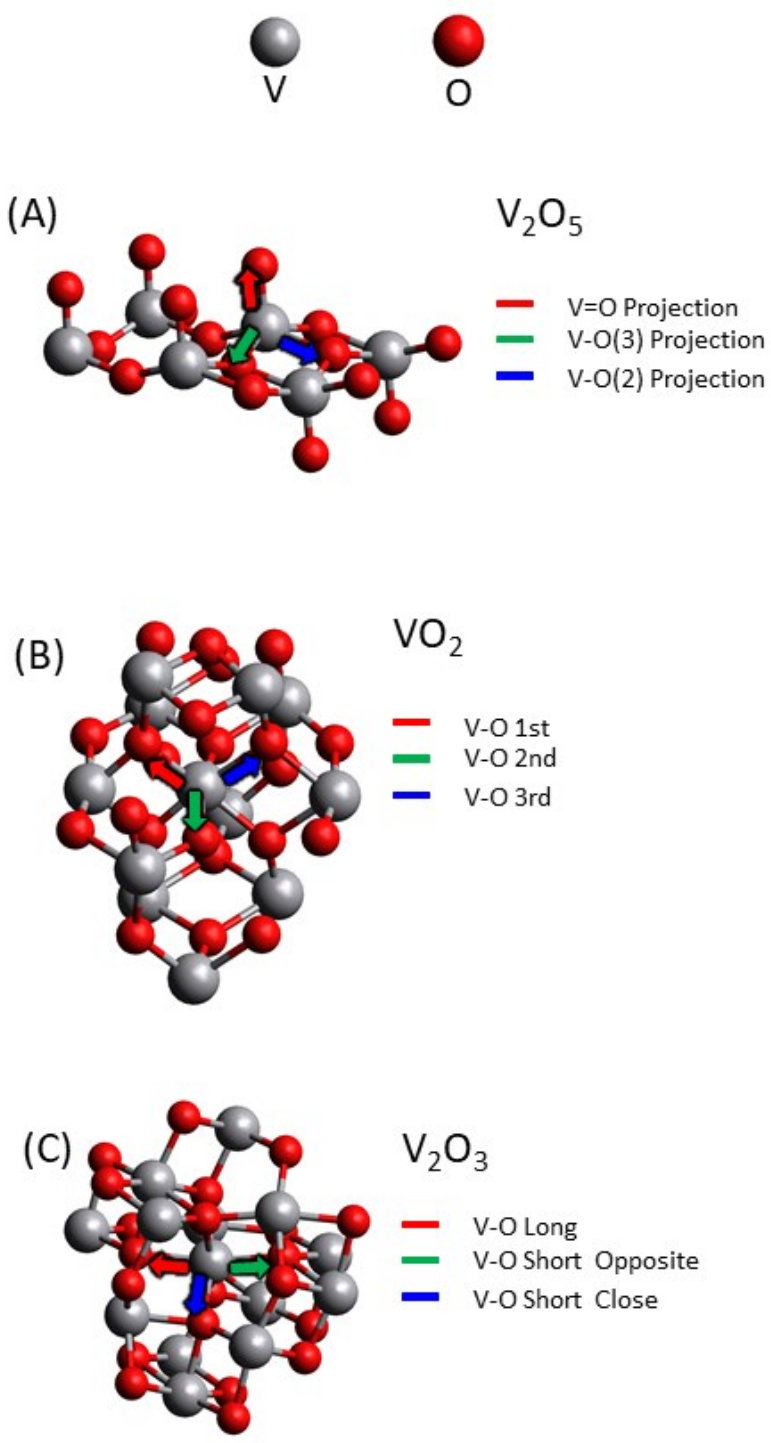


**Fig. S1:** A small number of atoms was extracted from the structure of $V_2O_5$ (a), $VO_2$ (b), and $V_2O_3$ (c). For a central V atom, three arrows are drawn to show the direction the projections were taken in Fig. 7 in the body of the manuscript. The color of these arrows matches the colors used in the legend on the right of each subpanel. Note that the small size of these groups is intended to aid visibility and is not related to the size of the clusters used in calculations.

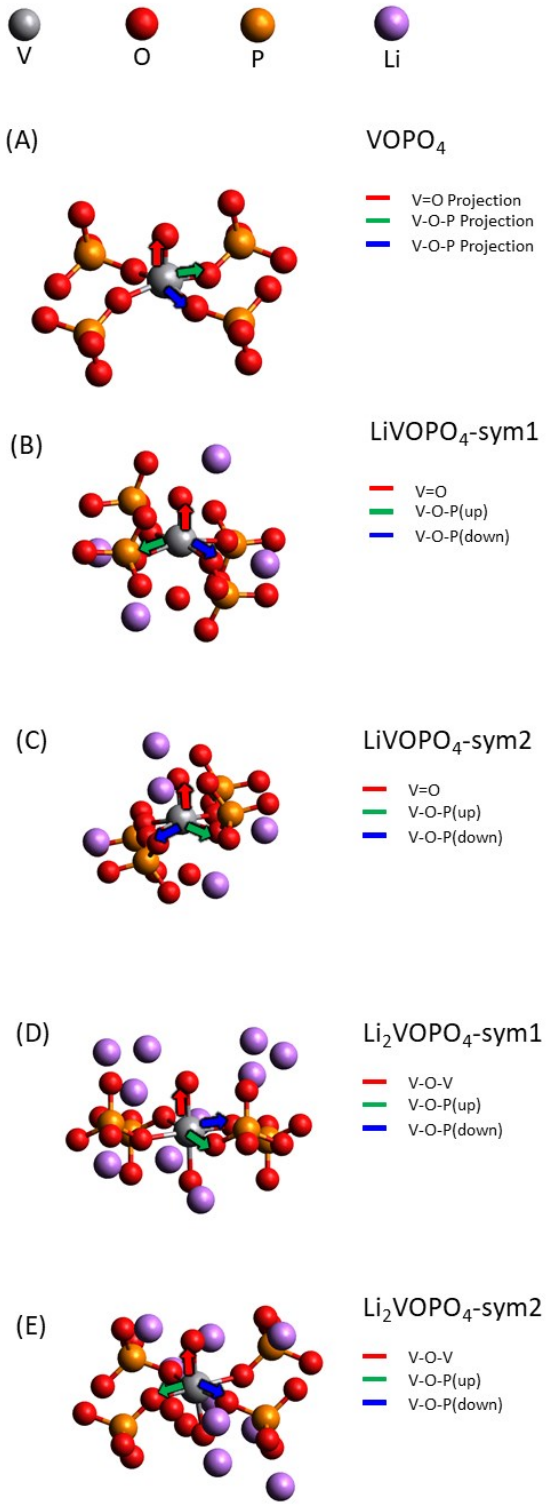


**Fig. S2:** A small number of atoms was extracted from each of the above structures. For a central V atom, three arrows are drawn to show the direction the projections were taken in Fig. 8 in the body of the manuscript. The color of these arrows matches the colors used in the legend. Note that the size of these groups is not related to the size of the clusters used in calculations.