Supporting Information for:

The effect of waters of hydration on the connectivity of uranium(IV) sulfate *x*-hydrate: $[U(SO4)_2(H2O)_5]\cdot H_2O$ and $[U(SO_4)_2(H_2O)_6]\cdot 2H_2O$ and a comparison to other known structures

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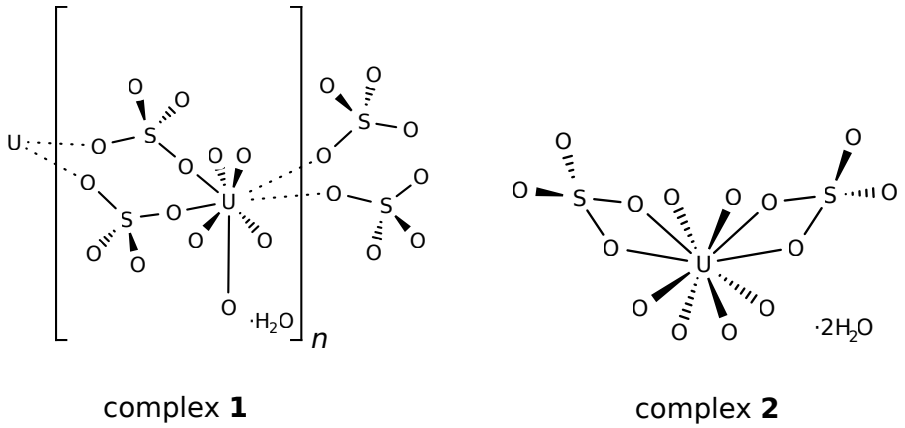

Figure A1. Structural diagrams of $[U(SO_4)_2(H_2O)_5]\cdot H_2O$ (**1**) and $[U(SO_4)_2(H_2O)_6]\cdot 2H_2O$ (**2**).

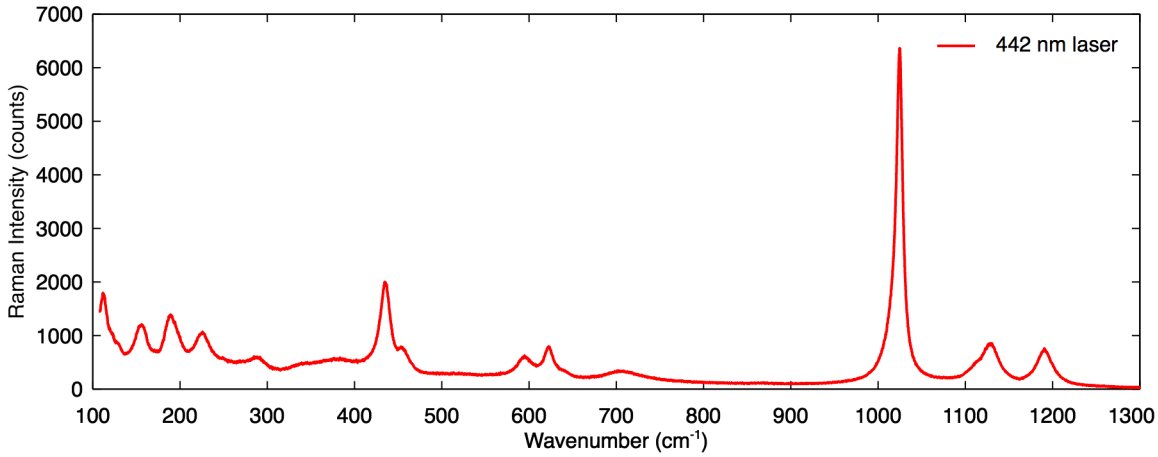

Figure A2. Raman spectrum of complex **1**, 442 nm laser.

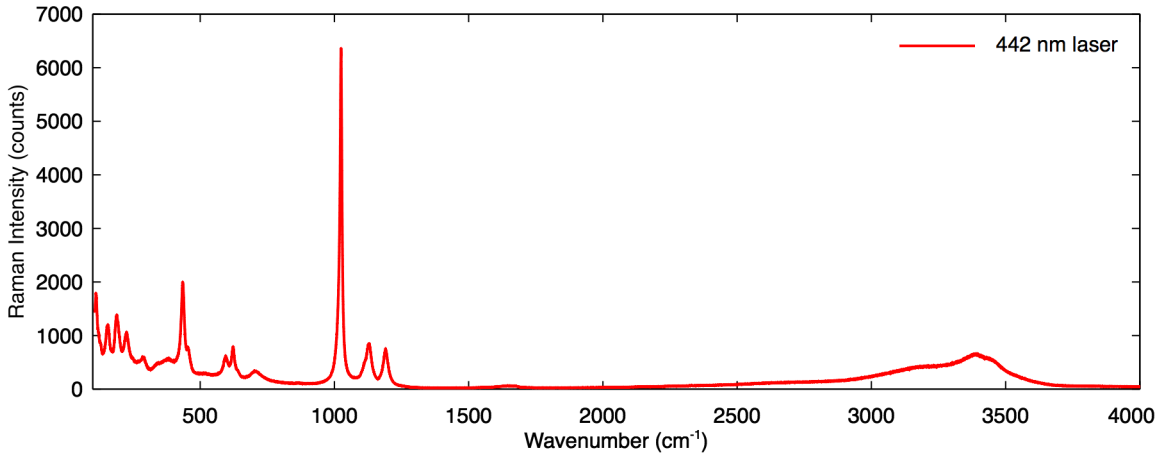

Figure A3. Extended Raman spectrum of complex **1**, 442 nm laser.

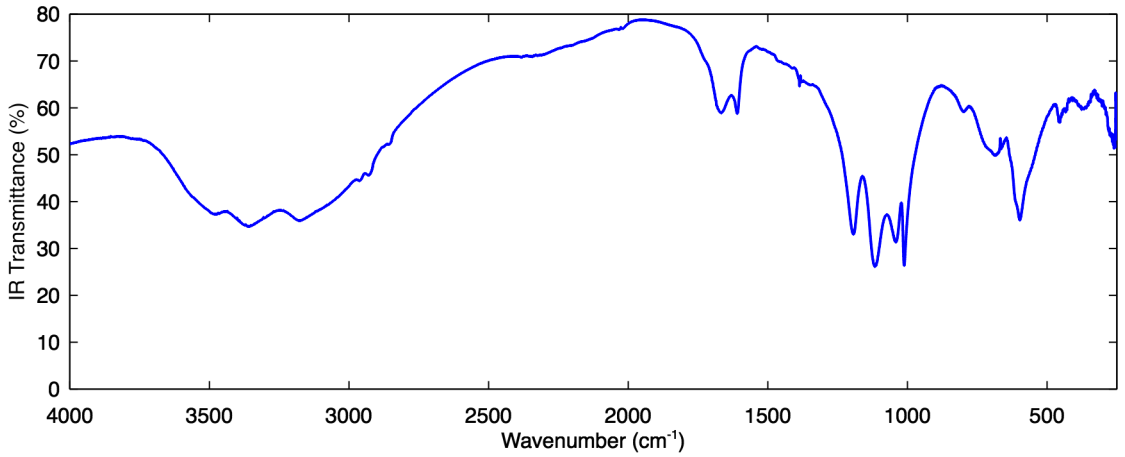

Figure A4. FTIR spectrum of complex **1**.

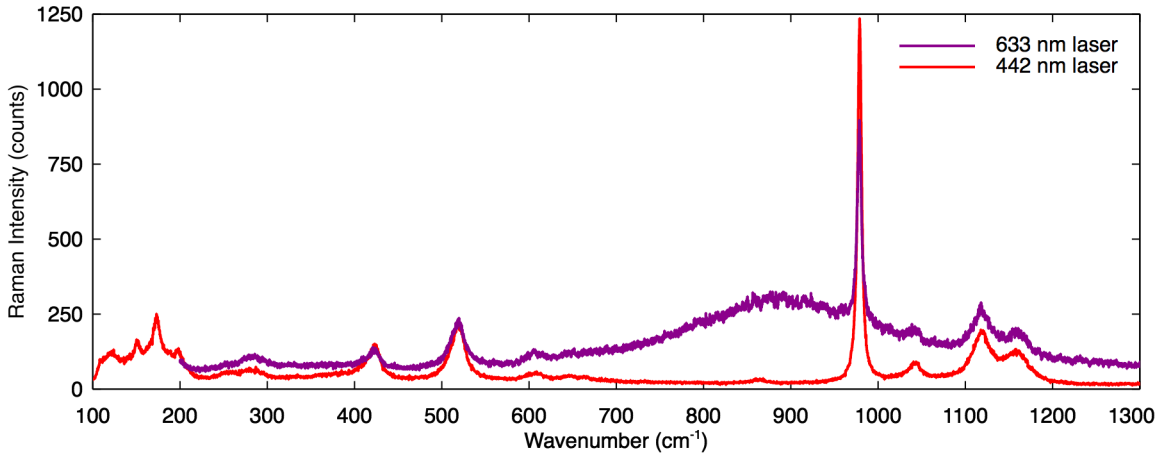

Figure A5. Raman spectra of complex **2**, 442 and 633 nm lasers, showing fluorescence.

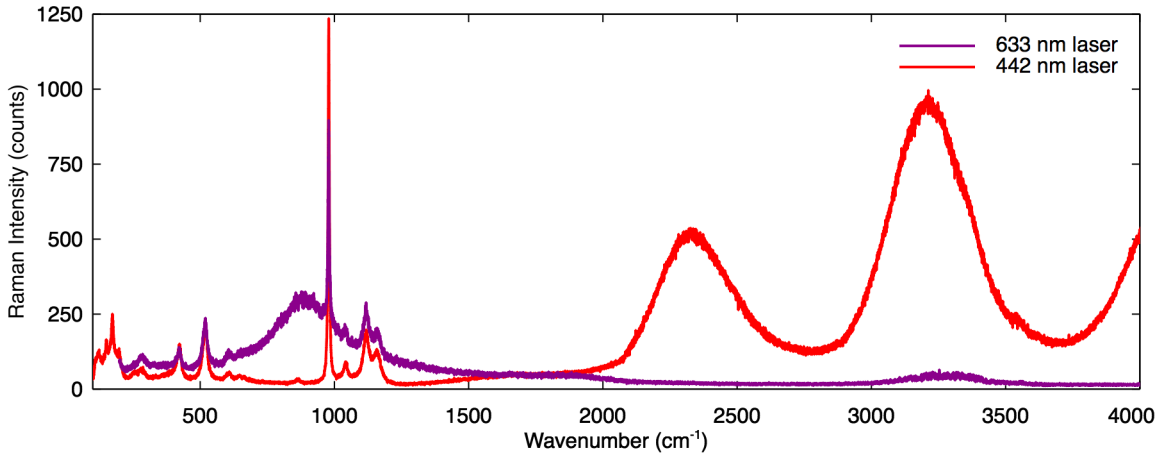

Figure A6. Extended Raman spectra of complex **2**, 442 and 633 nm lasers, showing fluorescence.

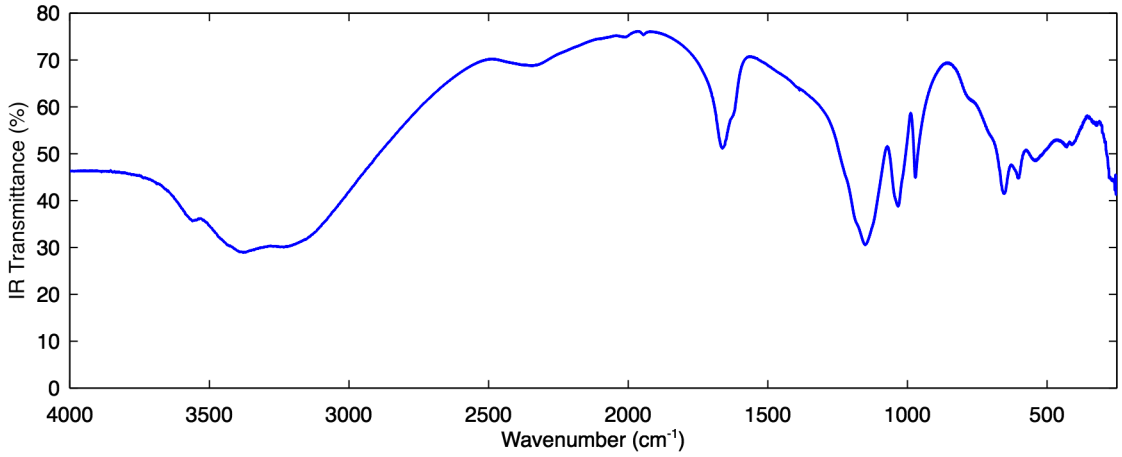

Figure A7. FTIR spectrum of complex **2**.

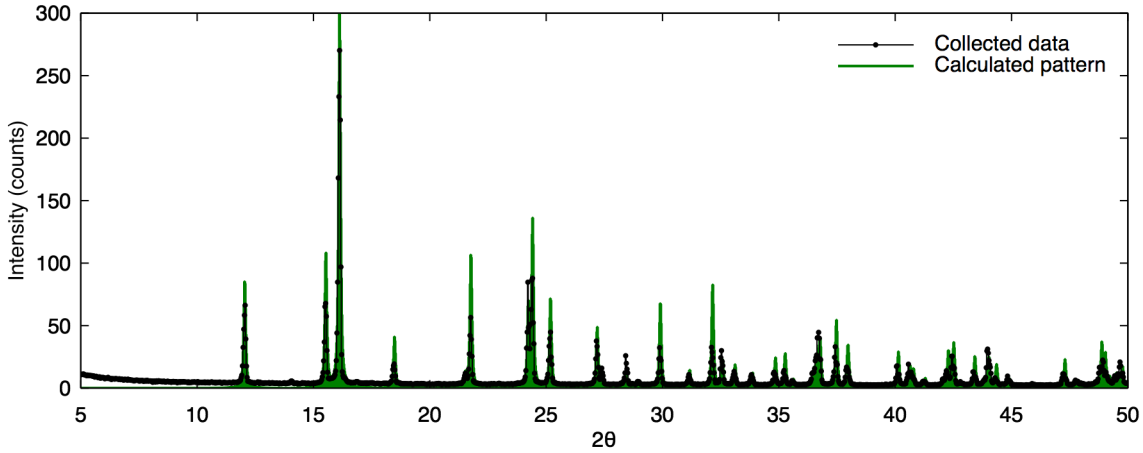

Figure A8. Powder diffraction pattern for complex **1**, showing the calculated and the collected patterns.

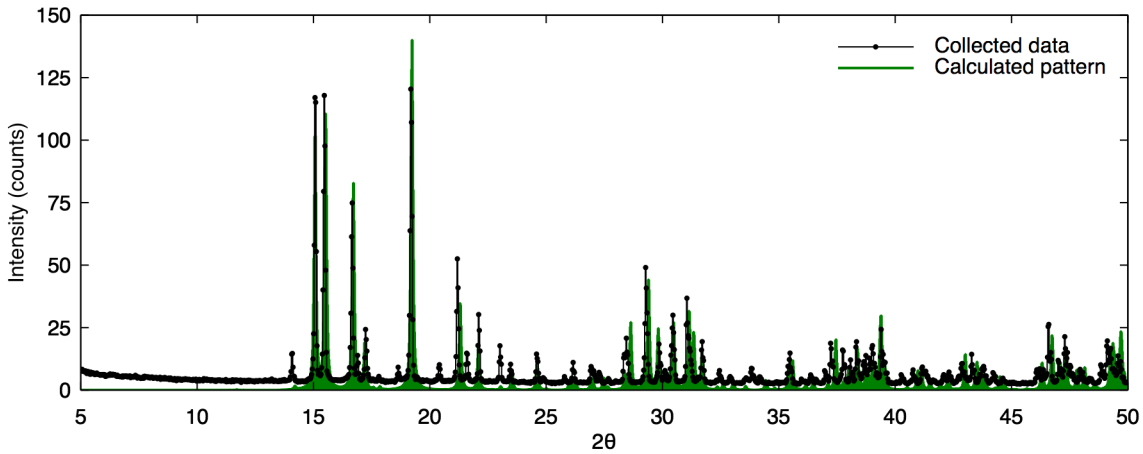

Figure A9. Powder diffraction pattern for complex **2**, showing the calculated and the collected patterns. The small peaks in the collected pattern that do not match the calculated pattern correspond to β-$U(SO_4)_2 \cdot 4H_2O$, suggesting slight degradation of the sample.

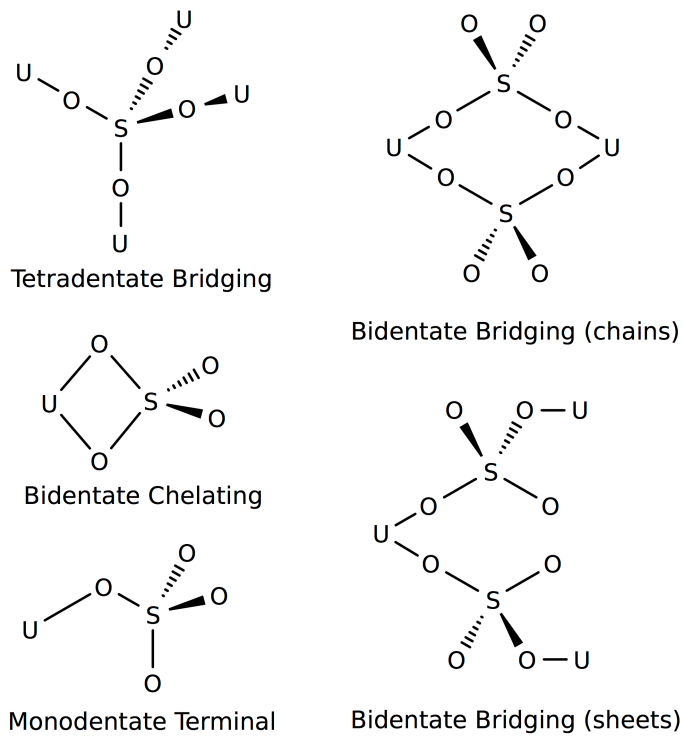

Figure A10. Drawings of the different sulfate binding modes observed in the known solid state uranous sulfate hydrate complexes.

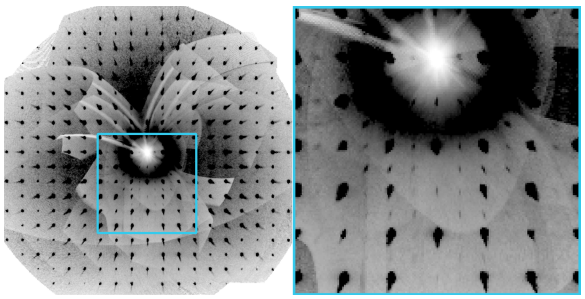

Figure A11. Pseudo-precession image of h0l zone for complex 1 (left), and a magnified view of the boxed region showing additional faint reflections.