

**Table S2.** *Luinaite-(OH)*: selected bond distances (in Å) for schorl-1A from Cleveland tin mine, Australia (Sample LUI-AUS), and for oxy-dravite-1A from Blue Mountain Saddle, USA (Sample LUI-USA)

Sample LUI-AUS											
X-O2C	2.516(4)										
X-O2A	2.531(4)										
X-O2B	2.553(4)										
X-O5A	2.751(5)										
X-O5B	2.768(5)										
X-O5C	2.768(4)										
X-O4C	2.781(5)										
X-O4B	2.820(4)										
X-O4A	2.844(5)										
<X-O>	<b>2.704</b>										
Ya-O2C	1.997(4)	Yb-O2C	1.964(4)	Yc-O2A	1.963(4)						
Ya-O2A	2.003(4)	Yb-O2B	1.981(4)	Yc-O2B	1.976(4)						
Ya-O6E	2.018(3)	Yb-O6A	1.994(3)	Yc-O6C	1.993(3)						
Ya-O6B	2.021(3)	Yb-O6D	2.005(3)	Yc-O1A	1.993(4)						
Ya-O1A	2.047(4)	Yb-O1A	2.008(4)	Yc-O6F	1.996(3)						
Ya-O3A	2.132(4)	Yb-O3C	2.091(4)	Yc-O3B	2.077(4)						
<Ya-O>	<b>2.036</b>	<Yb-O>	<b>2.007</b>	<Yc-O>	<b>2.000</b>						
Za-O8D	1.875(3)	Zb-O8A	1.889(3)	Zc-O6E	1.878(3)	Zd-O8F	1.911(3)	Ze-O6B	1.879(3)	Zf-O7E	1.913(3)
Za-O7D	1.889(3)	Zb-O7B	1.901(3)	Zc-O8B	1.884(4)	Zd-O6F	1.913(3)	Ze-O7F	1.893(3)	Zf-O6A	1.913(3)
Za-O6D	1.892(3)	Zb-O6C	1.908(3)	Zc-O7C	1.884(3)	Zd-O7A	1.921(3)	Ze-O8C	1.895(3)	Zf-O8E	1.923(3)
Za-O8C	1.920(3)	Zb-O8B	1.940(3)	Zc-O8E	1.910(4)	Zd-O8D	1.961(3)	Ze-O8F	1.917(3)	Zf-O8A	1.952(3)
Za-O7A	1.939(3)	Zb-O7E	1.956(3)	Zc-O7B	1.945(3)	Zd-O7F	1.990(3)	Ze-O7D	1.967(3)	Zf-O7C	1.992(3)
Za-O3C	1.979(4)	Zb-O3B	1.992(4)	Zc-O3A	1.981(3)	Zd-O3B	2.014(4)	Ze-O3A	1.991(3)	Zf-O3C	2.022(4)
<Za-O>	<b>1.916</b>	<Zb-O>	<b>1.931</b>	<Zc-O>	<b>1.914</b>	<Zd-O>	<b>1.952</b>	<Ze-O>	<b>1.924</b>	<Zf-O>	<b>1.953</b>
Ta-O6A	1.607(3)	Tb-O7A	1.600(3)	Tc-O7E	1.601(3)	Td-O7F	1.601(3)	Te-O7C	1.604(3)	Tf-O7D	1.609(3)
Ta-O7B	1.612(3)	Tb-O6B	1.606(3)	Tc-O6E	1.609(3)	Td-O6D	1.610(3)	Te-O6C	1.608(3)	Tf-O6F	1.610(3)
Ta-O4A	1.623(3)	Tb-O4A	1.626(3)	Tc-O4B	1.623(4)	Td-O4C	1.622(3)	Te-O4C	1.625(3)	Tf-O4B	1.622(4)
Ta-O5C	1.634(3)	Tb-O5A	1.637(3)	Tc-O5A	1.639(3)	Td-O5C	1.635(3)	Te-O5B	1.637(3)	Tf-O5B	1.638(3)
<Ta-O>	<b>1.619</b>	<Tb-O>	<b>1.617</b>	<Tc-O>	<b>1.618</b>	<Td-O>	<b>1.617</b>	<Te-O>	<b>1.619</b>	<Tf-O>	<b>1.620</b>
B1-O2A	1.360(5)	B2-O2C	1.372(6)	B3-O2B	1.361(6)						
B1-O8D	1.375(6)	B2-O8A	1.373(5)	B3-O8B	1.377(6)						
B1-O8E	1.378(6)	B2-O8F	1.382(6)	B3-O8C	1.383(5)						
<B1-O>	<b>1.371</b>	<B2-O>	<b>1.376</b>	<B3-O>	<b>1.374</b>						

Sample LUI-USA											
X-O2C	2.498(3)										
X-O2A	2.528(3)										
X-O2B	2.532(3)										
X-O5A	2.729(3)										
X-O5B	2.737(3)										
X-O5C	2.752(3)										
X-O4C	2.787(3)										
X-O4B	2.796(3)										
X-O4A	2.849(3)										
<X-O>	<b>2.690</b>										
Ya-O2C	1.959(2)	Yb-O2C	1.970(3)	Yc-O2A	1.942(3)						
Ya-O2A	1.971(2)	Yb-O2B	1.975(2)	Yc-O2B	1.959(2)						
Ya-O6E	1.977(2)	Yb-O6A	1.991(2)	Yc-O6C	1.959(2)						
Ya-O6B	1.980(2)	Yb-O6D	1.991(2)	Yc-O1A	1.967(2)						
Ya-O1A	1.991(2)	Yb-O1A	1.996(2)	Yc-O6F	1.975(2)						
Ya-O3A	2.080(3)	Yb-O3C	2.089(3)	Yc-O3B	2.039(3)						
<Ya-O>	<b>1.993</b>	<Yb-O>	<b>2.002</b>	<Yc-O>	<b>1.974</b>						
Za-O8D	1.879(2)	Zb-O8A	1.908(2)	Zc-O6E	1.883(2)	Zd-O8F	1.912(2)	Ze-O6B	1.908(2)	Zf-O7E	1.915(2)
Za-O7D	1.896(2)	Zb-O7B	1.928(2)	Zc-O8B	1.895(2)	Zd-O6F	1.934(2)	Ze-O7F	1.915(2)	Zf-O6A	1.919(2)
Za-O6D	1.899(2)	Zb-O6C	1.936(2)	Zc-O7C	1.903(2)	Zd-O7A	1.944(2)	Ze-O8C	1.920(2)	Zf-O8E	1.922(2)
Za-O8C	1.909(2)	Zb-O8B	1.954(2)	Zc-O8E	1.907(2)	Zd-O8D	1.958(2)	Ze-O8F	1.924(2)	Zf-O8A	1.933(2)
Za-O7A	1.931(2)	Zb-O7E	1.968(2)	Zc-O7B	1.933(2)	Zd-O7F	1.978(2)	Ze-O7D	1.975(2)	Zf-O7C	1.981(2)
Za-O3C	1.980(2)	Zb-O3B	2.013(2)	Zc-O3A	1.983(2)	Zd-O3B	2.018(2)	Ze-O3A	2.018(2)	Zf-O3C	2.021(2)
<Za-O>	<b>1.916</b>	<Zb-O>	<b>1.951</b>	<Zc-O>	<b>1.917</b>	<Zd-O>	<b>1.957</b>	<Ze-O>	<b>1.943</b>	<Zf-O>	<b>1.949</b>
Ta-O6A	1.602(2)	Tb-O7A	1.601(2)	Tc-O7E	1.594(2)	Td-O7F	1.594(2)	Te-O7C	1.600(2)	Tf-O7D	1.601(2)
Ta-O7B	1.607(2)	Tb-O6B	1.608(2)	Tc-O6E	1.609(2)	Td-O6D	1.610(2)	Te-O6C	1.610(2)	Tf-O6F	1.605(2)
Ta-O4A	1.624(2)	Tb-O4A	1.626(2)	Tc-O4B	1.627(2)	Td-O4C	1.624(2)	Te-O4C	1.622(2)	Tf-O4B	1.622(2)
Ta-O5C	1.641(2)	Tb-O5A	1.637(2)	Tc-O5A	1.638(2)	Td-O5C	1.640(2)	Te-O5B	1.640(2)	Tf-O5B	1.638(2)
<Ta-O>	<b>1.619</b>	<Tb-O>	<b>1.618</b>	<Tc-O>	<b>1.617</b>	<Td-O>	<b>1.617</b>	<Te-O>	<b>1.618</b>	<Tf-O>	<b>1.617</b>
B1-O2A	1.366(4)	B2-O2C	1.374(4)	B3-O2B	1.366(4)						
B1-O8D	1.378(4)	B2-O8A	1.375(4)	B3-O8B	1.376(4)						
B1-O8E	1.381(4)	B2-O8F	1.379(4)	B3-O8C	1.376(4)						
<B1-O>	<b>1.375</b>	<B2-O>	<b>1.376</b>	<B3-O>	<b>1.373</b>						