In the course of a study on the crystal chemistry of zirconium oxysalts synthesized at low-hydrothermal conditions [1-3] we also prepared the title compounds from Zr$_2$O$_2$(CO$_3$)(OH)$_2$, the respective acids and minor contents of water.

The Zr$_2$(OH)$_2$(XO$_4$)$_3$·4H$_2$O (X=S,Se) salts crystallize isotypic in space group C2/c, the structure of the sulfate has been described earlier [4]. The present single crystal X-ray data allowed high-quality refinements disclosing the hydrogen bonding system and its role in the framework structure of Zr$_2$O$_{14}$ dimers and XO$_4$ groups.

For Zr(SeO$_3$)$_2$, only a microcrystalline precipitate could be extracted so far, hence X-ray powder data were measured on a Bruker D8eco system. A previous description [5] in Pmmm (a=8.555, b=6.479, c=15.232 Å) resulted in several unindexed main peaks. The new cell is re-indexed in P2$_1$/c with a=4.9724(3), b=8.5992(5), c=6.9447(3) Å, $\beta$=110.128(3)°. The structure obtained from our Rietveld refinement proves isotypism with other $M^{IV}$($\text{SeO}_3$)$_2$ compounds, i.e. Ti(SeO$_3$)$_2$, $\beta$-Sn(SeO$_3$)$_2$ and Pb(SeO$_3$)$_2$ [6,7]. The Zr(IV)–O (2.031–2.083 Å) and Se–O (1.710–1.718 Å) bond lengths are in good agreement with values from literature.