On CuDy$_2$[B$_8$O$_{16}$] and CuHo$_2$[B$_8$O$_{16}$]:
Two New “Metaborates” with a $\frac{1}{\infty}$[B$_8$O$_{16}$]$^{8-}$ Anion

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Nearly colourless single crystals of the compounds CuDy$_2$[B$_8$O$_{16}$] (I) and CuHo$_2$[B$_8$O$_{16}$] (II) have been obtained by a B$_2$O$_3$ flux technique. They crystallize in the structure of CuTb$_2$[B$_8$O$_{16}$] (I) or in an orthorhombic variant (II). X-ray investigations on single crystals led to the space group C$_{2h}$-P$2_1$/c (Nr. 14) with lattice parameters $a = 1025,5(10); b = 836,99(10); c = 621,2(8)$ pm, $\beta = 90,47(10)^\circ; Z = 2$ (I) and D$_{2h}^9$ - Pham (Nr. 55) with $a = 840,7(2), b = 616,6(2), c = 1022,0(2)$ pm, $Z = 2$ (II). The structures contain $\frac{1}{\infty}$[B$_8$O$_{16}$]$^{8-}$ chains isolated from each other, which include tri- and tetracoordinated boron. The chains consist of alternating twelve and eight-membered rings of boron and oxygen atoms connected by BO$_4$ units. Dy$^{3+}$ and Ho$^{3+}$ are octacoordinated and Cu$^{2+}$ is hexacoordinated in elongated octahedra by oxygen. The relation between these two structures is discussed.

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