



Copper(I) halide complexes with ethylenediaminium $L^0(H^+)_2$, N,N,N',N'-tetraallylethylenediaminium $L^4(H^+)_2$, and N,N,N',N',N'-pentaallylethylenediaminium $L^5(H^+)$. Synthesis and crystal structures of the complexes $[L^0(H^+)_2]_{0.5}CuCl_2$, $[L^0(H^+)_2]_{0.5}CuBr_{1.67}Cl_{0.33}$, $[L^4(H^+)_2]_{0.5}Cu_2Cl_3$, and $[L^5(H^+)Cu_4Br_6]$.

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Streszczenie

Alkylation of ethylenediamine with allyl bromide in the presence of $NaHCO_3$ in benzene–ethanol and acetone–ethanol gave N,N,N',N'-tetraallylethylenediamine L^4 and N,N,N',N',N'-pentaallylethylenediaminium bromide $(L^5(H^+)Br)_2$, respectively. The ac electrochemical synthesis at copper wire electrodes in solutions of copper(II) halide and an appropriate ligand yielded single crystals of Cu(I) complexes with ethylenediaminium ($[L^0(H^+)_2]_{0.5}CuCl_2$ (I) and $[L^0(H^+)_2]_{0.5}CuBr_{1.67}Cl_{0.33}$ (II)) and its allyl derivatives N,N,N',N'-tetraallylethylenediaminium ($[L^4(H^+)_2]_{0.5}Cu_2Cl_3$ (III)) and N,N,N',N',N'-pentaallylethylenediaminium ($[L^5(H^+)Cu_4Br_6]$ (IV)). The crystal structures of complexes I–IV were determined by X-ray diffraction. The isostructural crystals of complexes I and II are triclinic, space group P , $Z = 2$. For I: $a = 5.936(3)$, $b = 6.387(3)$, $c = 7.126(4)$ Å, $\alpha = 67.82(4)^\circ$, $\beta = 72.98(4)^\circ$, $\gamma = 67.55(4)^\circ$, $V = 227.7(2)$ Å³. For II: $a = 6.110(3)$, $b = 6.657(3)$, $c = 7.309(3)$ Å, $\alpha = 68.40(3)^\circ$, $\beta = 72.38(3)^\circ$, $\gamma = 67.23(3)^\circ$, $V = 250.4(2)$ Å³. In structures I and II, the organic cations are between infinite anionic chains $(Cu)_n$. The crystals of π complex III are triclinic, space group P , $a = 6.851(4)$, $b = 8.729(4)$, $c = 9.960(4)$ Å, $\alpha = 98.25(3)^\circ$, $\beta = 102.29(3)^\circ$, $\gamma = 107.30(3)^\circ$, $V = 541.8(5)$ Å³, $Z = 2$. In structure III, all the four allyl groups are π coordinated by the metal atoms of four discrete anions Cu_4C . The crystals of π complex IV are monoclinic, space group $C2/c$, $a = 15.228(5)$, $b = 17.095(6)$, $c = 20.182(6)$ Å, $\beta = 92.43(4)^\circ$, $V = 5249(3)$ Å³, $Z = 8$. Only two of five allyl groups at the same N atom are coordinated by copper(I) atoms. Structure IV contains a complex inorganic fragment of the formula $(Cu_4Br)_2$.

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