

Copper(I) iodide complexes containing new aliphatic aminophosphine ligands and diimines—luminescent properties and antibacterial activity.

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The new, water soluble, aminomethylphosphines were synthesized from $\text{P}(\text{CH}_2\text{OH})_3$ and alkylpiperazines: $\text{P}(\text{CH}_2\text{N}(\text{CH}_2\text{CH}_2)_2\text{NCH}_3)_3$ (**1**) and $\text{P}(\text{CH}_2\text{N}(\text{CH}_2\text{CH}_2)_2\text{NCH}_2\text{CH}_3)_3$ (**2**). Described already in literature $\text{P}(\text{CH}_2\text{N}(\text{CH}_2\text{CH}_2)_2\text{O})_3$ (**3**) were also obtained. The spectroscopic ^1H , ^{31}P and ^{13}C NMR analyses and crystallographic studies of **1**, **2** and **3** demonstrate that all these compounds have similar structures and spectroscopic properties, which almost do not depend on aliphatic rings in the molecules. Heteroleptic copper(I) iodide complexes with phosphines mentioned above and 2,2'-bipyridine (bpy): $[\text{CuI}(\text{bpy})\text{P}(\text{CH}_2\text{N}(\text{CH}_2\text{CH}_2)_2\text{NCH}_3)_3]$ (**1B**), $[\text{CuI}(\text{bpy})\text{P}(\text{CH}_2\text{N}(\text{CH}_2\text{CH}_2)_2\text{NCH}_2\text{CH}_3)_3]$ (**2B**), $[\text{CuI}(\text{bpy})\text{P}(\text{CH}_2\text{N}(\text{CH}_2\text{CH}_2)_2\text{O})_3]$ (**3B**) or 1,10-phenanthroline (phen): $[\text{CuI}(\text{phen})\text{P}(\text{CH}_2\text{N}(\text{CH}_2\text{CH}_2)_2\text{NCH}_3)_3]$ (**1P**), $[\text{CuI}(\text{phen})\text{P}(\text{CH}_2\text{N}(\text{CH}_2\text{CH}_2)_2\text{NCH}_2\text{CH}_3)_3]$ (**2P**), $[\text{CuI}(\text{phen})\text{P}(\text{CH}_2\text{N}(\text{CH}_2\text{CH}_2)_2\text{O})_3]$ (**3P**) were also synthesized. All complexes were characterized by ^1H , ^{31}P and ^{13}C NMR spectroscopy also. Molecular structures of **1P**·PhCH₃ and **3P**·0.5Cu₂I₂(phen)₂ were determined from single crystal X-ray diffraction studies. Upon excitation at 470 nm, all complexes in the solid state exhibit red photoluminescence due to charge transfer transition. The luminescence of phen complexes is higher than the luminescence of bpy ones. The presented phosphines and copper(I) complexes were screened for their *in vitro* antibacterial and antifungal activity against *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* strains and *Candida albicans*. All the copper complexes exhibit significant antibacterial activity against *Staphylococcus aureus* strains. The activity of 1,10-phenanthroline complexes is higher than 2,2'-bipyridine complexes.

Adres publiczny

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