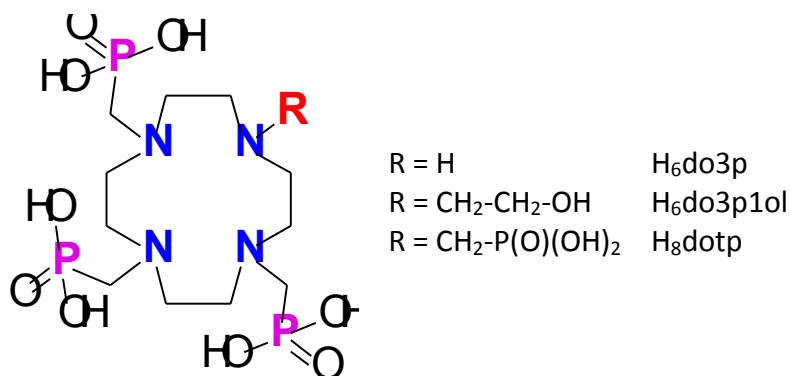


Effect of alkali metal ions on dissociation kinetics of Cu(II) complexes of DOTP-like macrocyclic ligands

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Cyclen based tetraaza-macrocyclic ligands are well known for their ability to bind ion Cu(II) leading to formation of complexes with high thermodynamic stability and kinetic inertness which are required for their in vivo applications and in medicine [1–3]. Some copper(II) complexes are ideal for using in clinical diagnosis because of their radioisotopic properties (positron emission tomography - PET, ^{64}Cu with half-life 12.8 h) or in radio-immunotherapy (^{67}Cu with half-life 62 h) [4]. In addition, the sodium and potassium ions play an important role in biology, e.g. concentration gradient of sodium/potassium ions is important in living organism for many cell functions, and their presence in the solution can affect the kinetic inertness of copper(II) complexes.



In this work, the acid-assisted dissociation kinetics of Cu(II) complexes with DOTP-like ligands (e.g. H₆do3p, H₆do3p1ol, H₈dotp [1,2]) was studied by means of molecular absorption spectroscopy in presence of Li⁺, Na⁺ and K⁺ salts employed as supporting electrolyte. It was found out that these ions significantly influence the rate of dissociation of copper(II) complex in K⁺; Na⁺; Li⁺ order and the parameters of chemical model describing this reaction correlate with their ionic size [5, 6]. This effect was not observed for analogous H₄dota ligand. This phenomenon is important for interpretation of reaction mechanism of copper(II) complex dissociation and it can be explained by formation of weak complexes between the phosphonate group and the alkali metal ions, analogously as described for lanthanide(III) complexes of DOTP [6].

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