Conclusion

In conclusion, the central aim of the thesis is the synthesis of polynuclear copper(II) and cobalt(II/III) complexes by using multidentate N, O-donor Schiff base ligand and study of their molecular properties such as magnetism, catalysis and biological activities. In my research work I have used three multidentate N, O- donor Schiff bases 2-[(2-Hydroxy-3-methoxybenzylidene)amino]-2-(hydroxymethyl)propane-1,3-diol (L^1), 2-[(2-hydroxy-ethylimino)-methyl]-6-methoxy-phenol (L^2) and (E)-2-((1-hydroxybutan-2-ylimino)methyl)phenol (L^3). The complexes are characterized by X-ray single crystal diffraction. Mixed-valence Co^{II}-Co^{III} complexes are formed when cobalt(II) salts are reacted with Schiff base ligand L^1 in addition with aromatic dicarboxylate which acts as co-ligand. By using Schiff base ligand L^2 and L^3 with copper(II) salts produced tetranuclear cubane-like complexes having Cu_4O_4 core. The different coordination mode of Schiff base ligand give rise to discrete tetranuclear and 1D coordination polymers, the latter being achieved by bridging ligand like *p*-phenylenediacrylate anions. Alternating current/direct current (ac/dc) magnetic studies revealed that the individual Co^{II}–Co^{III} unit exhibits field-induced slow magnetic relaxation consistent with single-ion magnet (SIM) behavior. Low temperature magnetic measurements allowed to derive ferromagnetic/antiferromagnetic exchange coupling in cubane-like tetranuclear coppercomplexes. The study of interactions of copper complexes with bovine serum albumin (BSA) and human serum albumin (HSA) were investigated by fluorescence method and interaction with calf thymus DNA (CT-DNA) was studied by electronic absorption and fluorescence method both. Using 3,5-di-tertbutylcatechol (3,5-DTBC) as a model substrate, copper complexes show catecholase-like activity, being able to oxidase 3,5-DTBC to 3,5-di-tertbutylquinone (3,5-DTBQ) in the presence of oxygen.