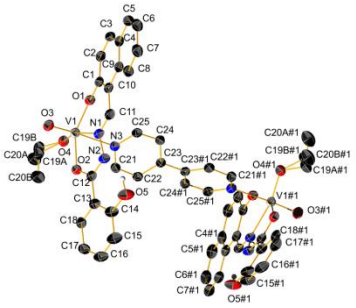
"A study of DNA/BSA interaction and catalytic potential of oxidovanadium(V) complexes with ONO donor ligands" Rupam Dinda*, S. P. Dash, S. Pasayat, P. K. Majhi, Department of Chemistry.



The study of DNA/BSA interaction and the catalytic potential of four mononuclear oxidoalkoxido vanadium(V) [$V^{V}O(L^{1-4})OEt$] (1–4) and one dinuclear oxidoalkoxido mixed-ligand vanadium(V) [{$VO(L^{2})$-$OEt\}_2(Q)$]{Q = 4,4'-bipyridine}(5) complexes, with tridentate binegative aroylazine ligands ***(*More in *Dalton Transactions, 2016, 45, 18292)***

Details

The study of DNA/BSA interaction and the catalytic potential of four mononuclear oxidoalkoxidovanadium(V) [$V^{V}O(L^{1-4})OEt$] (1–4) and one dinuclear oxidoalkoxido mixed-ligand vanadium(V) [{$VO(L^{2})$-$OEt\}_2(Q)$]{Q = 4,4'-bipyridine}(5) complexes, with tridentate binegative aroylazine ligands are reported [where H_2L^1 = anthranylhydrazone of 2-hydroxy-1-napthaldehyde, H_2L^2 = salicylhydrazone of 2-hydroxy-1-napthaldehyde, H_2L^3 = benzoylhydrazone of 2-hydroxy-1-acetonaphthone, H_2L^4 = anthranylhydrazone of 2-hydroxy-1-acetonaphthone]. All the complexes are characterized by elemental analysis as well as various spectroscopic techniques. Single crystal X-ray diffraction crystallography of 2 reveals that the metal centre is in distorted square pyramidal geometry with O_4N coordination spheres, whereas 5 exhibits a distorted octahedral geometry around the metal center. In addition, all the complexes (1–5) show moderate DNA binding propensity which is investigated using UV-vis absorption titration, circular dichroism, thermal denaturation and fluorescence spectral studies. The experimental results show that the complexes effectively interact with CT-DNA through both minor and major groove binding modes, with binding constants ranging from 10^4–10^5 M^{-1}. Among 1–5, complexes 3 and 4 show higher binding affinity towards CT-DNA than others and at the same time also exhibit negative ΔT_m values of about ~1.5 and 1.0 °C which resembles the properties shown by cisplatin. All complexes show moderate photoinduced cleavage of pUC19 supercoiled plasmid DNA with complex 3 showing the highest photo induced DNA cleavage activity of ~48%. In coherence with the DNA interaction studies, 3 and 4 also exhibit good binding affinity towards BSA in the range of 10^{10}–10^{11} M^{-1}, which is also supported by their ability to quench the tryptophan fluorescence emission spectra of BSA. All the complexes show remarkable photoinduced BSA cleavage activity (>90%) at a complex concentration of 50 μM. The catalytic potential of 1–5 is also tested for the oxidative bromination of styrene, salicylaldehyde and oxidation of methyl phenyl sulphide. All the reactions show a high percentage of conversion (>90%) with a high turnover frequency (TOF). Particularly, in the oxidative bromination of styrene the percentage of conversion and TOF vary from 96–98% and 8000–19600 (h^{-1}) respectively, which signifies the potential of these oxidovanadium(V) complexes to stimulate research for the synthesis of a better catalyst.