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Synthesis of novel platinum (II) complexes bearing sulfonamide appended diethylenetriamine ligands as a potential diagnostic tool

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The development of effective and safe novel platinum related pharmaceuticals is a current requirement in a growing body of research in organometallic chemistry. Cisplatin has served as the most popular chemotherapeutic agent for over two decades although its adverse effects and resistance have become a major disadvantage for therapeutic success. Therefore, the exploration of new platinum complexes has become a necessity. Conventionally, N-Sulfonamides have been used in various therapeutic targets. Our objective has been to synthesize two new platinum complexes and to explore their fluorescence activity as a diagnostic tool. L1: ($N(SO_2)$(1-nap)dien) and L2: ($N(SO_2)$(2-nap)dien were utilized to synthesize two new platinum(II) bidentate complexes; C1: [Pt($N(SO_2)$(1-nap)dien)Cl_2] and C2: [Pt($N(SO_2)$(2-nap)dien)Cl_2] The new platinum complexes were characterized by TLC, ^{1}H NMR, UV-Vis and fluorescence spectroscopies. In a ^{1}H NMR spectrum of [Pt($N(SO_2)$ (2-nap) dienH)Cl_2] recorded in DMSO-d_6, a mono-solvated species was observed immediately after dissolution. Three NH signals (6.06 ppm, N1H; 6.90 ppm, N2H; 8.06 ppm, N3H) helped to confirm that the [Pt($N(SO_2)$ (2-nap) dienH)Cl_2] bidentate complex has formed in comparison with previously reported forDNSH-dienH platinum complexes. In UV-Vis spectroscopy, the wavelengths of both complexes are shifted towards the shorter wavelength ranges (Hypsochromic shift). Emission spectra were recorded in methanol and enhanced fluorescence intensity was observed at 338 nm for the ($N(SO_2)$(1-nap)dien) ligand while its bidentate complex showed quenched fluorescence. Similarly, for the ($N(SO_2)$(2-nap)dien) ligand, enhanced fluorescence intensity was observed at 348 nm and its bidentate complex showed lower intensity. The sulfonamide group attached to dien in these metal complexes has the potential to act as a bio-conjugation anchorage. The promising photo-physical properties of the novel synthesized metal complexes allow us to hope that they may serve as good drug candidates for diagnostic purposes. The new compounds may also be applicable in biological systems as anticancer agents with the future evidences of bio assays.

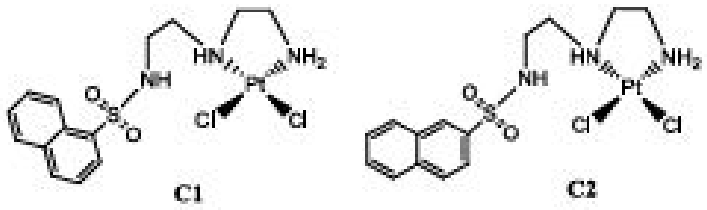

Figure 01: Line diagram of proposed platinum complexes C1: $[Pt(N(SO_2)(1\text{-nap})dien)Cl_2]$,C2: $[Pt(N(SO_2)(2\text{-nap})dien)Cl_2]$

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