

New ruthenium complexes containing *para*-substituted benzoic acid: Synthesis, characterization and cytotoxicity assays

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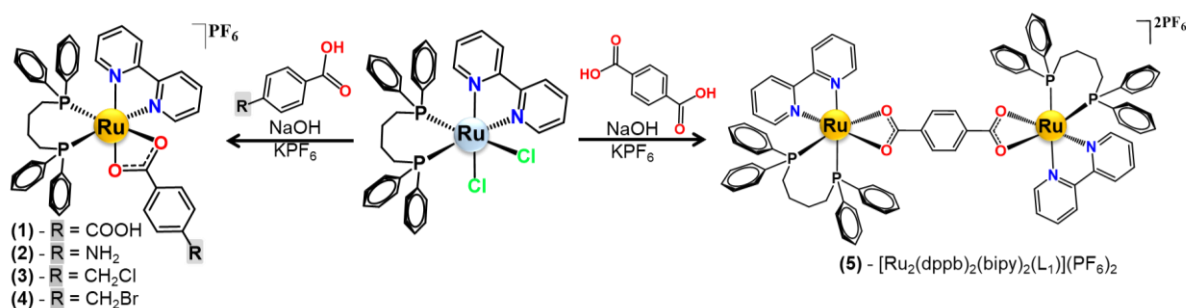
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Free functional groups are crucial in molecular interactions and biology as they enable the formation of bonds and interactions necessary for biochemical processes and cellular functions.[1,2] In this work we present the synthesis and characterization of five new ruthenium compounds with different *para* substituents in the coordinated benzoic acid, resulting in one new binuclear complex, with the formula $[\text{Ru}_2(\text{L}_1)(\text{dppb})_2(\text{bipy})_2](\text{PF}_6)_2$, and four mononuclear complexes, with general formula $[\text{Ru}(\text{L})(\text{dppb})(\text{bipy})]\text{PF}_6$ where L = terephthalic acid (H_2L_1), 4-aminobenzoic acid (HL_2), 4-(chloromethyl)benzoic acid (HL_3), 4-(bromomethyl)benzoic acid (HL_4), dppb = 1,4-bis(diphenylphosphino)butane, and bipy = 2,2'-bipyridine. The complexes were characterized by elemental analysis, molar conductivity, cyclic voltammetry, NMR, IR spectroscopies and single crystal X-ray diffraction. All spectroscopic experiments confirm the initial structure proposed to this complex's series. The molar conductivity values in DMSO indicate 1:1 cationic complex and the $^{31}\text{P}\{^1\text{H}\}$ NMR spectra of the complexes display double doublet signals, suggesting the phosphorus atoms trans to oxygen and nitrogen are not magnetically equivalent. Slow evaporation of complexes **2** and **4** from a $\text{CH}_3\text{OH}/\text{CH}_2\text{Cl}_2$ (1:1) solution yielded single crystals suitable for X-ray diffraction, confirming the proposed structures. The cytotoxicity of the complexes was tested against MDA-MB-231 human triple-negative breast tumor cells, A549 human lung tumor cells, A2780 human ovarian carcinoma cells, A2780cis cisplatin-resistant human ovarian carcinoma cells, and MRC-5 non-tumor human lung cells. The complex $[\text{Ru}(\text{L}_2)(\text{dppb})(\text{bipy})]\text{PF}_6$ was found to be the most cytotoxic and selective for the A2780 cell line. We conducted experiments on cell morphology using DAPI and PI staining and assessed colony formation.



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References

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