

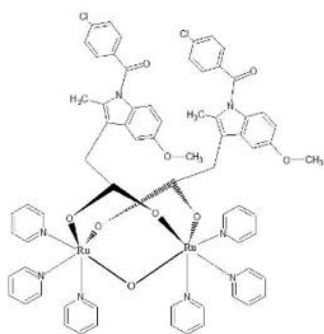
# A novel binuclear $\mu$ -oxo diruthenium complex combined with indomethacin: synthesis and characterization.

REIS, C.C.F.<sup>1\*</sup>, CACITA, N.<sup>1</sup>, NIKOLAOU, S.<sup>1</sup>

<sup>1</sup>Department of Chemistry – Faculdade de Filosofia Ciências e Letras de Ribeirão Preto – Av. Bandeirantes, 3900, CEP 14040-901 – Monte Alegre – Ribeirão Preto – SP- Brazil.

\*e-mail: [felipereis@usp.br](mailto:felipereis@usp.br)

Indomethacin (ind) is a phenylalkanoic acid known as one of the most potent non-steroidal anti-inflammatory drugs (NSAIDs)<sup>1,2</sup>. When this class of drug is combined with metal ions it yields coordination compounds that act against several diseases<sup>3</sup>. The development of metal complexes based on ruthenium comes as an interesting alternative for the treatment of cancer and other diseases, thus attracting the attention of many researchers<sup>4</sup>.



The aim of this work was to synthesize and characterize a novel binuclear  $\mu$ -oxo ruthenium complex with indomethacin,  $[\text{Ru}_2\text{O}(\text{ind})_2(\text{py})_6](\text{PF}_6)_2$  (py is pyridine). The complex was obtained by adaptations of the synthesis described by Sudha and collaborators<sup>5</sup>. The electronic spectrum of the complex shows a band at 590 nm ( $\epsilon=2776 \text{ cm}^{-1}\text{mol}^{-1}\text{L}$ ) characteristic of a charge transfer transition involving the  $d\pi(\text{Ru})$  and  $p\pi(\mu\text{-O})$  orbitals, this fact proves the formation of the  $\text{Ru}_2\text{O}$  unit<sup>6</sup>. Furthermore, there is an intense band at 320 nm ( $\epsilon=13102 \text{ cm}^{-1}\text{mol}^{-1}\text{L}$ ) assigned to the charge transfer transition, indicating that pyridines are actually coordinated to the complex<sup>7</sup>. The infrared spectra of the complex and the free indomethacin are quite similar, indicating the presence of indomethacin coordinated in the complex. However, the spectrum of the complex shows no band in  $1720 \text{ cm}^{-1}$  (the stretching frequency of the carboxylic acid function); this fact suggests that there is no free indomethacin, and that the drug is coordinated to the ruthenium through this function<sup>8</sup>. The cyclic voltammogram of the complex shows two distinct redox couples: an irreversible reduction near -1,15 V versus Ag/AgCl, which is assigned to  $\text{Ru}_2^{\text{II,III}}/\text{Ru}_2^{\text{III,III}}$  and a reversible oxidation couple near 0,60 V versus Ag/AgCl, which is assigned to  $\text{Ru}_2^{\text{III,III}}/\text{Ru}_2^{\text{III,IV}}$ <sup>9</sup>.

So far, the data obtained for the complex  $[\text{Ru}_2\text{O}(\text{ind})_2(\text{py})_6](\text{PF}_6)_2$  confirm its structure.

CNPq, CAPES, FAPESP.

<sup>1</sup> Strachan, C.J. *et. al.* Journal of Pharmacy and Pharmacology. **2006**, 59, 261-269. <sup>2</sup> Tarushi, A. *et. al.* Journal of Inorganic Biochemistry. **2014**, 140, 185-198. <sup>3</sup> Seuanes, G.C. *et. al.* Journal of Inorganic Biochemistry, **2015**, 153, 178-185. <sup>4</sup> Levina, A. *et. al.* Metallomics: Integrated Biometal Science, **2009**, 1, 458-470. <sup>5</sup> Sudha, C. *et. al.* Inorganic Chemistry, **1998**, 37, 270-278. <sup>6</sup> Llobet, A. *et. al.* Inorganic Chemistry, **1988**, 28, 3131-3137. <sup>7</sup> Fukumoto, T. *et. al.* Inorganica Chimica Acta, **1998**, 283, 151-159. <sup>8</sup> Nakamoto, K. Infrared and Raman Spectra of Inorganic and Coordination Compounds. **2009**. <sup>9</sup> Hotzelmann, R., *et. al.* Journal of American Chemical Society, **1992**, 114, 9470-9483.