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Considerable attention has been paid during the past decade to studying binuclear organometallic complexes in the hope that cooperative effects between the two metal centers might exalt (or arise new ones) the physical and chemical properties exhibited by a single metal site.<sup>1</sup>

The goal is to tune the electronic and chemical interactions<sup>2</sup> between ligand-bridged metal groups among which at least one undergoes reversible reduction or oxidation and may behave as a molecular switch that can be turned on and off by electron transfer.<sup>3</sup>

Many classes of multi-site bridging ligands have been explored; among them we cite the bis-cyclopentadienyl derivatives in which two five-membered rings are bonded directly. The fulvalenyl bridge, in fact, is particularly efficient in transmitting the electronic effects between two redox centers and bi-sandwich fulvalenyl complexes have been thoroughly investigated as their voltammetric behavior often involves redox cascades.<sup>4</sup> Recently, a series of homo-bimetallic (ferrocenyl)-indenyl cyclopentadienyl iron compounds was prepared and their voltammetric behavior studied.<sup>5</sup> The introduction of an indenyl group in place of a cyclopentadienyl group increases the interaction between the two iron atoms as indicated by the E<sub>1/2</sub> values. The easy preparation of 3-ferrocenyl indene ligand prompted us to investigate on the heterobimetallic iron-rhodium indenyl complexes. To our knowledge no previous heterobimetallic compounds have been reported in which iron and rhodium are grafted to the same bridging ligand in a very close proximity.

We have now synthesized new complexes in which the ferrocenyl-substituted indenyl ligand is complexed with the RhL<sub>2</sub> group (L<sub>2</sub>= cyclooctadiene, norbornadiene, L= CO) in order to observe the influence of the iron group in different redox states and of different ancillary ligands on the physical and chemical properties of the rhodium center.

The structures of the binuclear (1-ferrocenyl)-indenyl-Rh(CO)<sub>2</sub> and (1-ferrocenyl)-indenyl-Rh(nbd) complexes are shown in Figures 1 and 2. The Iron and Rhodium nuclei are disposed in *cisoid* and *transoid* configurations, respectively. The results of the electrochemical oxidation of the binuclear complex are in favor of the existence of a strong chemical interaction between the two metals. The stability of the intermediates and the redox mechanism depend on the structural conformation and the nature of the ancillary ligands.

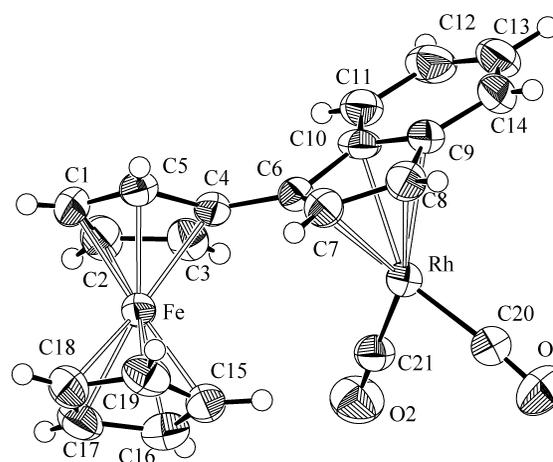


Figure 1

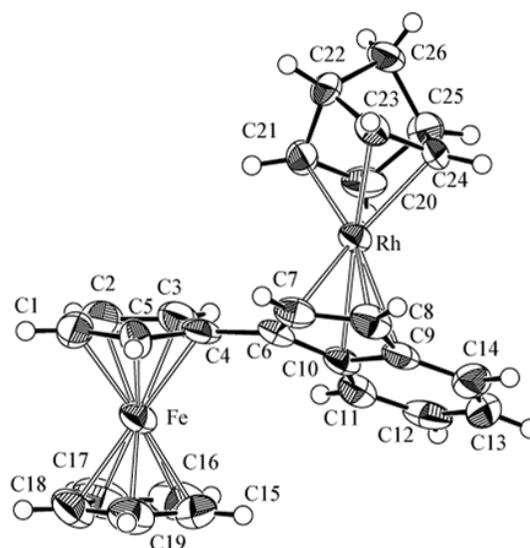


Figure 2

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