WORKSHOP ON PLATINUM CHEMISTRY

ABSTRACTS

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METAL-METAL BONDS IN FIVE-COORDINATE PLATINUM(II) COMPLEXES

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It is well known that the catalytic properties of transition ions can be enhanced by the presence of a main group metal in their coordination sphere [1].

For example, complexes containing Pt(II) – E bonds (E = Ge, Sn, Pb) catalyze the hydroformylation, isomerization and hydrogenation of unsaturated compounds [1,2]. The intermediates occurring in these processes are typically five coordinate platinum(II) species containing the metal atom and the olefin in cis position. In spite of this, scant examples of stable complexes containing similar coordination environments have been described.

On these grounds and taking into accounts the well-known properties of sterically hindered bidentate ligands, which markedly stabilize trigonal bipyramidal arrangement around \( d^8 \) ions [3], we have developed [4] the synthesis of five-coordinate olefin platinum(II) complexes containing an organometal fragment in axial position. The binuclear species have been synthesized through oxidative addition of organometal halides to three-coordinate platinum(0) precursors, according to
the equation:

\[ M = Ge, Sn, Pb; x + y = 3 \]
\[ M = Hg; x = 1, y = 0. \]

In addition to the interest for the unusual coordination number, type I complexes deserve attention at least in two further respects:

i) in the case of organomercury and organotin halides, reaction (1) is an equilibrium and represents a rare example of reversible oxidative addition process in the chemistry of platinum(0).

ii) the coordinative saturation of platinum atom greatly enhances the stability of organometal fragments, such as \( Pt - PbR_2Cl \) and \( Pt - HgR \), which commonly undergo fast decomposition processes [5].

REFERENCES


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