



UPO

UNIVERSITÀ DEL PIEMONTE ORIENTALE
DIPARTIMENTO DI SCIENZE E INNOVAZIONE TECNOLOGICA

EVENTI DiSIT

Seminario | Seminar

28-11-2024

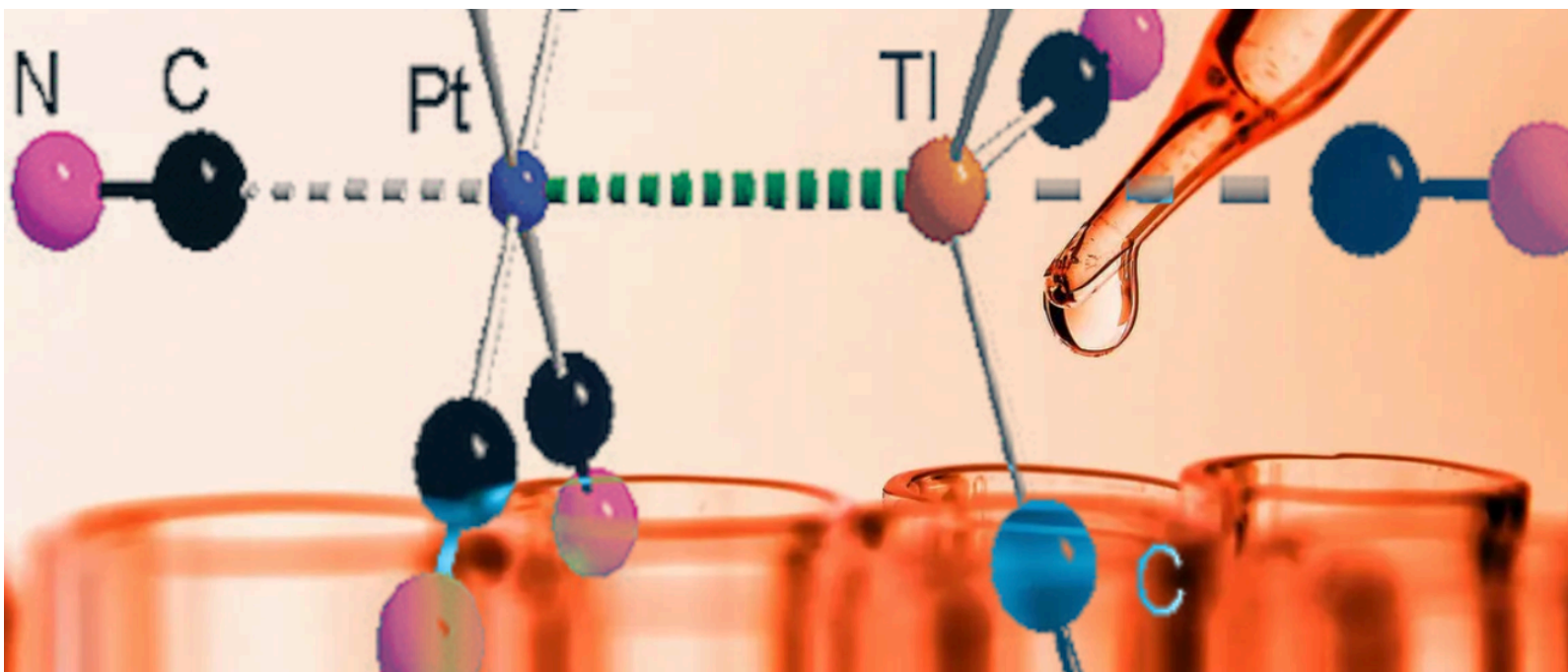
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Aula 203

NMR study of selected metal ion – Ligand systems: equilibrium, structure and dynamics

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According to our knowledge the NMR Spectroscopy is the most widely used experimental method in chemistry research including the field of metal-complexes. Using the vastly different NMR technics (often developed for organic chemistry) many questions raised in preparation and characterisation of metal-ligand coordination compounds can be answered. Several aspects of such kind of science are: equilibrium constants, the stoichiometry of species including solvation, constitution, i.e. binding mode and denticity of a ligand, isomers, rate of the formation, ligand exchange reactions, fluxionality etc.

Selected examples mainly from our own experimental work done in the last decade are going to be presented. Without the technical details we try to show the advantages and limitations of the multinuclear 1D and 2D NMR spectroscopy in coordination chemistry.

Although NMR does not usually have the precision of potentiometric measurements in order to determine the stability constants, it can provide an important independent check on their accuracy, e.g. Al(III) – F⁻ system.¹ Stoichiometry of a hexanuclear complex, Bi(III)₆O₄(OH)₄6⁺, studied by ¹H NMR will be presented.² High resolution NMR spectroscopy is superior to study the structure of complexes in solution, but there is an obvious need to take into account the intra molecular isomerisation / fluxionality of the complexes, because a fast rearrangement of the donor atoms (including the water) in the inner sphere might virtually increase the symmetry. Examples of metal-metal bonded cyanides, (CN)₅Pt-Tl(CN)_n⁻ (n=0,1,2,3)³ for symmetry, whilst lanthanide(III)-macrocycle complexes⁴ for fluxionality will be mentioned. Structure of a new polyoxometallate (POM), [Ti₂{β-SiW₈O₃₀(OH)}₂]₁₂⁻, is evaluated in solution by ²⁰³Tl/²⁰⁵Tl NMR.^{5,6}

References

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EVENTO APERTO A:

Docenti | Teachers, Borsisti | Research Fellows, Assegnisti | Postdoctoral researchers, Dottorandi | PhD students, Studenti | Students, Esterni UNIUPO | external UNIUPO people
SEMINARIO IN LINGUA: Inglese

