



Istituto di Chimica dei Composti Organometallici

ICCOM Pisa incontra ICCOM Firenze

Venerdì 31 Maggio 2019

Alle ore 11:00

presso Aula 2 - Edificio F
Area della Ricerca CNR, Firenze

La [Dr.ssa Emanuela Pitzalis](#) di ICCOM-Pisa terrà il seguente seminario:

"Mechanisms involved in chemical vapor generation for atomic spectrometry using aqueous borane complexes: additives and other critical parameters controlling sensitivity"

[Dr. Francesco Vizza](#)
ICCOM-CNR

Abstract:

Chemical generation of volatile species (CVG) is one of the most important and powerful sample introduction techniques for the determination and speciation of trace element by atomic or mass spectrometry. Derivatization by aqueous tetrahydridoborate (BH_4^-), sodium or potassium salts, is the most popular method for the generation of Hg^0 and the volatile hydrides of As, Sb, Bi, Ge, Sn, Pb, Se and Te; more recently, the aim of CVG has been extended to many transition and noble metals. More recently amine boranes reagents ($\text{R}_3\text{N}\cdot\text{BH}_3$, R=H, alkyl) have been employed as reagents both for diagnostic and analytical applications. Mechanisms operating in CVG by aqueous boranes will be discussed in the light of the most recent evidences. The attention will be mainly focused on the role played by sample composition – acidity, type of acid or buffer and chemical additives – in the control of the mechanism of CVG of volatile hydrides under analytical conditions (analyte $< 10^{-6}$ mol L^{-1} , borane $> 10^{-2}$ mol L^{-1}), in the absence of interfering species. Available evidences will be reported in order to discuss the role played in CVG by some chemical species, such as the hydrolysis products of borane reagents or chemical additives that can take part in the process. While some of mechanistic aspects of the chemistry of aqueous boranes have been clarified thanks to the contribution of CVG coupled with atomic or mass spectrometry, other ones are still matter of debate and need further investigations, also in the light of applications other than CVG.

Biographic sketch:



Emanuela Pitzalis graduated in Chemistry in 1992 at the University of Pisa, with the thesis 'Preparation, resolution and conformational studies of ruthenium chiral arene complexes'. She got her PhD in Chemistry in 1996, on "Homo and heteronuclear aggregates of transition metals: preparation, characterization and examination of their physico-chemical properties". She developed part of her research as a post-graduate fellow at the "Institut de Recherches sur la Catalyse", CNRS, Lyon (FR). 1996-2001 experience: Research contracts and teaching support, University of Pisa, working on preparation and characterization of transition metals nanoaggregates using metal vapor as reagents. Since 2001 she has been a permanent researcher at CNR, first at IPCF, then at ICCOM-PI. She was responsible for the CNR research activities PM.P03.015 (2009-2015) 'Development and application of physico-chemical and analytical methodologies for the environment'. Principal investigator of three years research agreement IPCF-IBEM (LI) (2007/09) 'Environmental monitoring of Follonica Gulf through physico-chemical characterization of marine sediments, along with setup of analytical procedures of metals'. Research unit manager PRIN 20082008SXASBC_003 (2010/12) 'Study of new experimental procedures for the synthesis of colloidal metal nanoparticles using electromagnetic radiation'. Participant in 5 LIFE* EU Projects. Advisor of Master Students in Chemistry (UNIPI). Research interests: Fundamentals and applications of hydride generation by borane complexes (NaBH_4 , amine boranes). Chemical vapor generation coupled with atomic spectrometry/mass spectrometry for trace and ultratrace analysis and speciation. Environmental chemistry. Nanomaterials. Organometallic Chemistry. She is co-author of 35 peer reviewed publications on ISI journals, 2 book chapters, 40 contributions to national and international conferences as poster and oral communications.