



ICCOM Pisa incontra ICCOM Firenze

Venerdì 31 Gennaio 2020

Alle ore 11:00

presso Aula 2 - Edificio F
Area della Ricerca CNR, Via Madonna del Piano 10, Sesto
Fiorentino

Il **Dr. Alessandro D'Ulivo** di ICCOM-Pisa terrà il seguente
seminario:

"The contribution of chemical vapor generation to the
comprehension of the chemistry of aqueous boranes"

Dr. Francesco Vizza
ICCOM-CNR

Abstract:

Chemical Vapor Generation (CVG) by aqueous borane reagents has been employed as an analytical derivatization technique for the conversion of aqueous ions of several metals and semi-metals to their volatile derivatives. At present CVG is a popular technique and it has been widely employed in the determination and speciation of several elements at ultratrace level by atomic and mass spectrometry. More recently dedicated studies were developed with the aim to clarify the mechanisms governing the chemistry of CVG by using NaBH_4 (THB) and amine-boranes (ABs), NR_3BH_3 (R=H, alkyl) for aqueous phase derivatization [1-4].

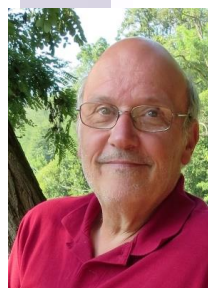
In the recent years the studies on fundamental aspect of CVG served not only to reconcile CVG with the chemistry of aqueous boranes, but they also provide new evidence on the mechanism of hydrolysis of aqueous boranes, some of which were unknown in the fundamental chemistry literature [1,2].

This lecture presents and discusses some evidence indicating that the chemistry of aqueous boranes is essentially the chemistry of their hydrolysis products, which are generally referred as to 'hydridoboron species'. The nature of the hydridoboron species formed during the hydrolysis of THB and ABs, is controlled by the reaction conditions employed in CVG (sample composition, pH, type of chemical reactor). The evidence provided by CVG coupled with atomic or mass spectrometry combined with the study of the rate of dihydrogen evolution during borane hydrolysis can be useful for the implementation of improved CVG reaction systems, as well as they could stimulate further investigations in the field of hydrogen storage where boranes play an important role.

[1] D'Ulivo L., Spiniello R., Onor M., Campanella B., Mester Z., D'Ulivo A., *Anal. Chim. Acta* 998 (2018) 28-36. [2] D'Ulivo L., Pagliano E., Onor M., Mester Z., D'Ulivo A., *Anal. Bional. Chem.* 411 (2019) 1569-1578. [3] D'Ulivo L., *J. Anal. At. Spectrom.* 34 (2019) 823-847. [4] D'Ulivo A., Onor M., Pitzalis E., *Anal. Chem. Anal. Chem.* 76 (2004) 6342-6352.

Biographic sketch:

Alessandro D'Ulivo graduated in Chemistry at University and Pisa (1978), and is a Senior Researcher of Italian National Research Council (since 1981). He is presently developing his research activity at the Institute of Chemistry of Organometallic Compounds of CNR, research unit of Pisa, of which he was head from 2010 to 2013. Teaching Analytical Chemistry and supervising graduate and PhD students for thesis at the Department of Chemistry and Industrial Chemistry, University of Pisa (since 1991) and Scuola Normale Superiore, Pisa (2010-2013). Awarded of Ioannes Marcus Marci Medal (2018) and of the national scientific qualification of Full Professor in Analytical Chemistry (2013).



Member of the Editorial Advisory Board of *Spectrochimica Acta*, Part B, Atomic Spectroscopy (since 2006); IUPAC Fellow (since 2011); Chairman, Colloquium Spectroscopicum Internationale XL (Pisa, 2017). His research interests focus on analytical atomic and mass spectrometry for trace and ultratrace analysis, fundamentals and applications of chemical and photochemical vapor generation techniques for trace analysis. International scientific cooperation includes N.R.C. Canada, Academy of Science of the Czech Republic, Laurentian University (Canada), Max Planck Institute for Chemistry, Federal University of Santa Catharina, (Brazil), Federal University of São Carlos (Brazil), Xiamen University (China). He authored and co-authored 112 scientific papers on international ISI journals, with over 3740 citations (H=34), 2 book chapters, 1 patent.