



RESEARCH PROGRESS REPORT

For the period of January 1 to December 22, 2007

Issued by

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This annual Research Report, issued for the seventh time, is being distributed to our friends, previous co-workers, and colleagues working in areas of mutual interest. Upon request, we shall be happy to send reprints and preprints of accepted manuscripts. In your request, please refer to the numbers shown in [brackets] at the end of each publication citation. Many of our publications, in the form of preprints, are fully available in the website: www.incaweb.org



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RESEARCH GROUP

CA' FOSCARI UNIVERSITY OF VENICE

Prof. Pietro R. Tundo, Professor of Organic Chemistry
Prof. Maurizio Selva, Associate Professor of Organic Chemistry
Dr. Alvise Perosa, Researcher
Dr. Alessandro Loris, PhD student
Dr. Filippo Fossa, PhD student

Visiting Researchers

Dr. Elena Goulobina (Moscow State University, Department of Chemistry, Russia)
Dr. Shelomou Alexey (Moscow State University, Department of Chemistry, Russia)
Dr. Kachevskiy Stanislav (Moscow State University, Department of Chemistry, Russia)
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Dr. Djellouli Mebarka (Djillali Liabes University in Sidi-Bel-Abbes, Algeria)
Dr. Charles Lefevre (Universite de Haute-Alsace, France)

INTERUNIVERSITY CONSORTIUM "CHEMISTRY FOR THE ENVIRONMENT" – MARGHERA LABORATORY

Green Chemistry

Dr. Fabio Aricò
Dr. Anthony Rosamilia
Dr. Umberto Toniolo
Dr. Sandra Grego
Dr. Enrico Militello
P.I. Maurizio Rigo

Analytical Group

Dr. Stefano Raccanelli, (Coordinator)
Dr. Tiziano Scarpa
P.I. Maurizio Favotto
P.I. Mauro Campeol
P.I. Fabio Tagliapietra
P.I. Alessandro Ragazzo
P.I. Federico Marchetto
P.I. Federico Monetti

Environmental Microbiology

Dr. Fulvio Zecchini
Dr. Joana Sofia Mendes Da Costa

RESEARCH ACHIEVEMENTS OF PIETRO R. TUNDO AND HIS RESEARCH GROUP

A) New reactions of dimethylcarbonate and their reaction mechanism

The reactivity of dialkyl carbonates, in particular that of dimethylcarbonate (DMC), as of the alkylation/carboxylation agents with a low environmental impact, has been studied. This investigation has been directed towards the following topics:

- Mechanistic investigation on DMC as ambident electrophile.
- New reactions promoted by DMC with the investigation of the zeolite catalysts for the selective mono-N-methylation of primary amines;
- The use of asymmetric methylalkyl carbonates for the reactions of O- and N-methylation;

B) Hydrodehalogenation and other reactions carried out under multiphase conditions

A few years ago we discovered a methodology, which has been further studied and extended by now, to carry out the hydrodehalogenation reactions at low temperatures (50°C), with H₂ at atmospheric pressure, and in the presence of a phase transfer agent.

The catalytic hydrodehalogenation of polyhalogenated aromatic compounds covers the relevant environmental interests in consideration of the large number of halogenated compounds having a high toxicity, such as, for example, polychlorinated dibenzo-p-dioxins and dibenzofurans and polychlorobiphenyls, present in water and soils.

C) Heteropolyacids

The problems associated with the handling and disposal of the inorganic acids and their environmental and potential hazards have raised our interest in the development of alternative procedure using solid acid catalysts. Numerous developments are being carried out by heterogeneous (HPAs, heteropolyacid) in basic research as well as technological processes.

We were interested in the utilization in our heterogeneous conditions, namely multiphase catalysis, already applied for hydrodehalogenation reactions. These new conditions have provided easier separation of products and saving of hydrogen peroxide.

The research themes described in units A)- C) have been reported in the following scientific publications.

PUBLICATIONS

The Journal of Organic Chemistry Manuscript ID: jo-2007-01818d.R1

Reaction of the Ambident Electrophile Dimethyl Carbonate with the Ambident Nucleophile Phenylhydrazine

Rosamilia, Anthony; Aricò, Fabio; Tundo, Pietro

Abstract:

In order to explore the ambident electrophilic reactivity of dimethyl carbonate (DMC), reactions with the ambident nucleophile phenylhydrazine were investigated. When a Brønsted base was used, selective carboxymethylation occurred at **N-1**, after that several other compounds were produced selectively utilising various conditions. Formation of these compounds was explained using the Hard-Soft Acid-Base (HSAB) theory. Catalysis by some metal salts altered the reactivity of phenylhydrazine, which effected selective carboxymethylation at **N-2** of phenylhydrazine instead.

[248]

European Journal of Inorganic Chemistry DOI: 10.1002/ejic.200

Suzuki aryl coupling catalysed by palladium bis(phosphine) pincer complexes based on ferrocene. X-ray structure determination of {PdCl[{2,5-(Bu^t₂PCH₂)₂C₅H₂}Fe(C₅H₅)]}OTf

Alexey M. Sheloumov,^{*[a]} Pietro Tundo,^{[b],[c]} Fedor M. Dolgushin,^[a] and Avthandil A. Koridze^{*[a],[d]}

[a] A.N. Nesmeyanov Institute of Organoelement Compounds, Russian Academy of Sciences, Moscow, Russian Federation

[b] Interuniversity Consortium "Chemistry for the Environment" (INCA)

[c] Department of Environmental Science, Ca' Foscari University, Venice, Italy

[d] I. Javakhishvili Tbilisi State University Georgia - USA

Abstract:

Palladium P,C,P pincer complexes PdCl[{2,5-(R₂PCH₂)₂C₅H₂}Fe(C₅H₅)] (**1**, R=Prⁱ; **2**, R=Bu^t) and {PdCl[{2,5-(Bu^t₂PCH₂)₂C₅H₂}Fe(C₅H₅)]}OTf (**3**) catalyse Suzuki aryl coupling under homogeneous conditions as well as in multiphase (in a triphase-organic/Aliquat336/aqueous-solvent) system; the X-ray structure of oxidized at iron atom complex **3** has been determined and compared with that of its neutral precursor **2**.

[247]

Vanadium-Substituted keggin type heteropolyacid are used for the Selective Oxidation of Sulfides to Sulfoxides and sulphones using hydrogen peroxide"

G. Romanelli^{1,2}, P. Vázquez¹ and P. Tundo^{3,4}

¹ Centro de Investigación y Desarrollo en Ciencias Aplicadas "Dr. Jorge J. Ronco" (CINDECA) Facultad de Ciencias Exactas, Universidad Nacional de La Plata - CONICET. Calle 47 N° 257 (B1900AJK) La Plata, Argentina.

² Laboratorio de Estudio de Compuestos Orgánicos (LADECOR) Facultad de Ciencias Exactas, Universidad Nacional de La Plata. Calles 47 y 115 (B1900AJL) La Plata, Argentina.

³ Department of Environmental Science, Ca' Foscari University, Dorsoduro 2137, 30123 Venice (Italy)

⁴ Interuniversity Consortium "Chemistry for the Environment", Via della Libertà 5/12, 30175 Venice – Marghera (Italy)

Abstract:

The pyridine salts of H4PMo11VO40, H5PMo10V2O40, and H9PMo6V6O40 acids, obtained by V substitution in the H3PMo12O40 structure, were synthesized. They were characterized by DRX, TGA and FT-IR, in addition, the variation of their acid properties and that of their original acids were determined by titration with n-butylamine. The FT-IR spectrum of H3PMo12O40 was modified when Mo+6 atoms were substituted in the Keggin structure by V+5 atoms and the spectra of pyridine salts, prepared from H4PMo11VO40, H5PMo10V2O40 and H9PMo6V6O40 acids, showed the characteristic bands of Keggin structures. In the case of PMo12O40Py3, PMo10V2O40Py5 and PMo6V6O40Py9 salts, the acid strength was not modified when protons of the original acids had been substituted by pyridine. The H4PMo11VO40 acid presents different acidic behavior than that synthesized heteropolyacids. When all the protons were substituted by pyridine in H4PMo11VO40 the acid strength decreased. However, when only one proton was substituted in H4PMo11VO40, the acid strength increased and shape of potentiometric curve was very similar to unsubstituted heteropolyacid. Keggin-type molybdovanadophosphate pyridinium salt proved to be highly active and selective catalysts for the hydrogen peroxide oxidation, in homogeneous system, of sulfide to the corresponding sulfoxide and sulfone derivatives. A convenient catalytic procedure has been found to oxidizing sulfides to sulfoxides, with 35% aqueous H2O2, using pyridinium salts as catalysts. The oxidation reaction is carried out at room temperature and requires a short time. For both products, sulfoxides and sulfones, the selectivity was high. In conclusion, reagents and catalysts are cheap and easily available.

[227]

Chem. Soc. Rev., 2007, 36, 532-550

Multiphasic heterogeneous catalysis mediated by catalyst-philic liquid phases

Pietro Tundo and Alvise Perosa

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Abstract

This *critical review* addresses heterogeneous catalysis in systems where multiple liquid phases coexist and where one of the phases is catalyst-philic. This technique provides built-in catalyst separation, and product recovery for organic reactions. Focus is placed on the components of the multiphasic systems with emphasis on the constituents of the catalyst-philic phases (PEGs, onium salts, ionic liquids) that incorporate the catalysts, as well as on the effects on catalytic efficiency. It collects a wide body of scattered information that is often labelled with different terms.

[234]

Chemoselective reactions of dimethyl carbonate catalysed by alkali metal exchanged faujasites: the case of indolyl carboxylic acids and indolyl-substituted alkyl carboxylic acids

Maurizio Selva, Pietro Tundo, Davide Brunelli and Alvisè Perosa

Dipartimento di Scienze Ambientali dell'Università Ca' Foscari and Consorzio Interuniversitario Nazionale "la Chimica per l'Ambiente" INCA, Dorsoduro 2137—30123 Venezia, Italy. E-mail: tundop@unive.it, alvise@unive.it

Abstract

At 160–180 °C, in the presence of alkali metal exchanged faujasites (MX or MY; M = Li, Na, K), the reaction of dimethyl carbonate with indolyl-3-acetic, -3-propionic, and -3-butyric acids proceeds towards the formation of the corresponding methyl esters or carbamate esters which can be isolated in 93–99% yields. The methylation of the indolyl-NH group is never observed. This high chemoselectivity is driven by the nature of the catalyst and the reaction temperature. In particular, among the six different zeolites used, the more basic MX faujasites show better performances in terms of both activity and selectivity than MY solids. A similar trend also holds for the reaction of dimethyl carbonate with indolyl-carboxylic acids, where MX compounds are still efficient catalysts for the formation of methyl esters. In this case, however, the overall reactivity/selectivity also reflects the relative positions of the NH and CO₂H groups which may account for significant decarboxylation reactions observed for indolyl acids substituted at positions 2 and 3. This process is totally absent for indolyl-6-carboxylic acid.

[244]

Formation and reaction of diazonium salts in a CO₂/H₂O system

P. Tundo*, A. Loris and M. Selva

Department of Environmental Science, Ca' Foscari University, Dorsoduro 2137, 30123 Venice

Abstract

The formation of diazonium salts from the corresponding primary aromatic amines and their reaction with potassium iodide to give the corresponding aryl iodide have been performed in a CO₂/H₂O solvent system. The weak acidity of this system (pH about 3) allowed the formation of triazenes as an intermediate *via* a reversible reaction. Furthermore, several aryl iodides have been synthesised with high purity. Their isolation was achieved by venting CO₂, without the utilization of organic solvents.

[236]

Monitoring of polychlorinated dibenzo-*p*-dioxins and dibenzofurans, dioxin-like PCBs and polycyclic aromatic hydrocarbons in food and feed samples from Ismailia city, Egypt

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^d Interuniversity Consortium "Chemistry for the Environment", Via delle Industrie 21/8 Venice – Marghera (Italy)

Abstract

Concentrations of polychlorinated dibenzo-*p*-dioxins and dibenzofurans (PCDD/Fs), polychlorinated biphenyl (PCBs) and polycyclic aromatic hydrocarbons (PAHs) have been determined using GC/HRMS in food (butter, seafood and meat) and feed samples (chicken, cattle and fish) purchased from Ismailia city, Egypt. PCDD/F concentrations in food samples ranged between 0.12 and 3.35 pg WHO TEQ/g wet w, while those in feed samples were between 0.08 and 0.2 pg WHO TEQ/g dry w. Levels of PCB TEQ ranged from 0.14 to 3.2 pg/g wet w in the food samples. The feed samples have an average of 0.35 pg PCB TEQ /g dry w. In this study, butter samples showed the highest contamination levels of PCDD/Fs and PCBs. The PCBs contribution to the total TEQ was on average 63% in seafood and on average 49% for meat and butter. The highest contamination levels of PCDD/Fs and PCBs were found in butter samples. The butter TEQ content is several times higher than that reported in all EU countries and exceeded the EU limits, while the PCDD/F levels in seafood and the feed samples is far below the current EU limit. Generally, congener profiles in the food samples reflect the non-industrialized nature of the city and suggest solid waste burning as a significant source of emission. Nevertheless, the profiles for butter suggest an impact from various sources. In the case of the sum of 16 PAH contamination levels in food samples were in the range of 11.7–154.3 ng/g wet w and feed samples had a range of 116–393 ng/g dry w. Benzo(*a*)pyrene (BaP) has been detected in the range of 0.05–3.29 ng/g wet w in the food samples; butter showed the highest contamination which exceeded the EU standard set for fats and oil. Fingerprints of PAHs suggested both petrogenic and pyrolytic sources of contamination.

[241]

Design of new systems for transfer hydrogenolysis of polychlorinated aromatics with 2-propanol using a Raney nickel catalyst

Sergei Zinovyev^a, Andrei Shelepchikov¹ and Pietro Tundo^b

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^b*Ca' Foscari University of Venice, Scienze Ambientali, Dorsoduro 2137, 30123 Venezia, Italy*

Abstract

A multipurpose study deals with the transfer hydrogenolysis of 1,3,5-trichlorobenzene to benzene in the 2-propanol–Raney nickel system in the presence of KOH. At 70 °C, no reaction occurs without KOH or with weaker bases, e.g. amines or poorly soluble inorganic bases; however saturated KOH as well as water over 1% suppress the reaction rate, presumably due to the competitive adsorption of these species on the catalyst. The catalytic activity also drops with time because of the deposition of the solid KCl on the catalyst but can be recovered at washing the catalyst with water. The deactivation by KCl can be mitigated with the addition of promoters, e.g. quaternary ammonium salts (Aliquat 336, CTAC) or trioctylamine. Aliquat 336 also promotes hydrodechlorination in the hydrothermal system using a 10% solution of 2-propanol in water, Raney nickel and potassium carbonate as base at 150–200 °C and 10–20 bar. Under these conditions, hexachlorobenzene was also selectively dechlorinated to benzene.

[245]

Pure Applied Chemistry, 2007, Vol 79, N. 11, 1905-1914

Heterogeneous catalysts and process for reductive dechlorination of polychlorinated hydrocarbons

E.S. Lokteva, E.V. Golubina., S.A. Kachevsky, A.O. Turakulova, V.V. Lunin and P. Tundo

Abstract:

The utilization and decomposition of chlorinated wastes without formation of dioxins are challenges of great environmental importance. In this work, the catalytic reductive methods of chlorinated organics processing are described, focusing on catalyst development. Pd-containing catalysts are improved by modification of supports [use of ultra dispersed diamond (UDD) or double oxides] or by dilution of Pd by not-noble metals (Fe, Ni, Cu). Both ways are effective for the processing of 1,3,5-trichlorobenzene (TCB) as a model of polychlorinated organics. The reasons for improvement of catalysts are discussed. The best catalysts were effectively used for hydrodechlorination (HDC) of hexachlorobenzene (HCB).

[246]

MANUSCRIPTS IN PRINT

Toxicological and Envir. Chem., 2006

Distribution of Polychlorinated dibenzo-*p*-Dioxins, Polychlorinated dibenzofurans, Dioxin-Like Polychlorinated Biphenyl and Polycyclic aromatic Hydrocarbons in the Sediment of Tamsah Lake, Suez Canal, Egypt

Pietro Tundo^a, Laila A. Reda^b, Naglaa Loutfy^b, Nanal Hefny^b,
Mohamed Tawfic Ahmed^b, Stefano Raccanelli^c

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Abstract

Lake Tamsah is one of the main wetlands in the Suez Canal region and the main source for fish for the area. The lake is the end-point of several waste water effluents. In the present study, residues of polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), dioxin-like polychlorinated biphenyl (PCB) and polycyclic aromatic hydrocarbons (PAH) were monitored in the sediment of the lake. Samples were collected from six different sampling stations around the lake using a box-corer sampler, then kept frozen. Samples were extracted and cleaned up before residue determination was conducted using an HRGC/HRMS. An HP 6890 plus gas chromatograph was coupled to a Micromass Autospec Ultima mass spectrometer operating in EI mode at 35 eV and with a resolution of 10.000 (5% VALLEY). PCDDs and PCDFs were detected in all sediment samples collected from various sampling stations. Results showed some progressive increase PCDDs concentrations relevant to increase in chlorination.

[221]

SUBMITTED MANUSCRIPTS

Synlett,

Multiphase oxidation of alcohols and sulfides with hydrogen peroxide catalyzed by heteropolyacids

P. Tundo*^{a, b}, G. P. Romanelli^c, P. G. Vázquez^c and F. Aricò^a

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b Cà Foscari University; Dept. of Environmental Science, Dorsoduro 2137, 30123 Venice (Italy)

c Centro de Investigación y Desarrollo en Ciencias Aplicadas "Dr. Jorge Ronco" (CINDECA), Universidad Nacional de La Plata- CONICET, Calle 47 N 257 (B1900AJK) La Plata (Argentina).

Abstract

Keggin-type heteropolyacids have been used as catalysts for high-yielding oxidation reactions using multiphase conditions. This simple and efficient procedure promoted the conversion of a wide range of alcohols and sulfides to the corresponding carbonyl, sulfoxide and sulfone derivatives. In comparison with homogeneous systems the oxidation from alcohols to aldehydes is more effective (yield > 90 %) and the solvents used are not toxic.

[240]

Synthesis of dialkyl ethers by decarboxylation of dialkyl carbonates

Pietro Tundo*^{a, b}, Sofia Memoli^a, Fabio Aricò^a, Anthony Rosamilia^a, and Filippo Fossa^b

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b Cà Foscari Università di Venezia; Dipartimento Scienze Ambientali, Dorsoduro 2137 - 30123 Venice (Italy)

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Abstract

The decarboxylation reaction of dialkyl carbonates to give their parent ethers was investigated. The reaction was carried out at atmospheric pressure and in the presence of hydrotalcite or basic alumina as catalysts. No solvent was used. The influence of several reaction parameters (e.g. temperature, amount of catalyst, substrate concentration) on the selectivity was studied. The stability of the catalyst was also investigated.

The experimental data for the decarboxylation confirmed that this reaction is complicated by competitive processes, such as *dismutation* and, to a less extent, pyrolysis, in one case.

The results obtained show that in the presence of hydrotalcite as a catalyst, symmetrical dialkyl ethers can be synthesized with yields up to 84 %. Dissymmetrical ethers (i.e. methyl alkyl ethers) can be produced if operating at high temperature (250 °C), with yields up to 80 %.

The catalyst proved to be fully recyclable in all cases studied, except for carbonate containing *n*-octyl moiety.

[249]

Multiphase oxidation of aniline to nitrosobenzene with hydrogen peroxide catalyzed by heteropolyacids

P. Tundo^{a, b}, G. P. Romanelli^c, P. G. Vázquez^c and A. Loris^a

a Interuniversity Consortium "Chemistry for the Environment"; Via della Libertà 5/12, 30175 Marghera Venice (Italy)

b Cà Foscari University; Dept. of Environmental Science, Dorsoduro 2137, 30123 Venice (Italy)

c Centro de Investigación y Desarrollo en Ciencias Aplicadas "Dr. Jorge Ronco" (CINDECA), Universidad Nacional de La Plata- CONICET, Calle 47 N 257 (B1900AJK) La Plata (Argentina).

Abstract

Keggin-type heteropolyacids have been used as catalyst for high-yielding oxidation reactions in multiphase conditions. This simple and efficient procedure promoted the conversion of anilines to the corresponding nitroso and nitro derivatives. In comparison with homogeneous system the oxidation from anilines to nitroso compounds and nitro compounds are more effective and the solvents used are not toxic.

[250]

EDITED BOOKS

1. P. Tundo (coordinatore), traduzione in inglese dell'estratto da: "Introduzione alla chimica verde (Green Chemistry) Libro per le scuole Superiori", "The Global Climate Change-The Greenhouse effect and the depletion of the Ozonoe Layer", **2007**
2. P. Tundo (coordinatore), traduzione in portoghese dell'estratto da: "Introduzione alla chimica verde (Green Chemistry) Libro per le scuole Superiori", "A mudança do clima global-O efeito estufa e a diminuição da camada de ozônio ", **2007**
3. P. Tundo (coordinatore), traduzione in spagnolo dell'estratto da: "Introduzione alla chimica verde (Green Chemistry) Libro per le scuole Superiori", "El Cambio Climático-El efecto Invernadero y la disminución de la capa de ozono", **2007**
4. P. Tundo, "Green Chemical Reactions", Springer Ed. **2007**

BOOKS CHAPTER

5. P. Tundo, F. Aricò, A. Rosamilia, S. Grego "Dimethyl Carbonate. Green Solvent and Ambident Reagent" in *Green Chemical Reactions*, Springer Ed. **2007**

PATENTS

1. M. Selva and P. Tundo "Sintesi di aniline funzionalizzate mono-N-Sostituite", Consorzio Interuniversitario Nazionale La Chimica per l'Ambiente Patent N. PD2002A325 – n. Concessione 1.334.947 – **2006**.
2. P. Tundo, S. Grego, M. Rigo and Paludetto: Innovative Heterogeneous Catalysts for the Reaction Between aromatic amines and dimethylcarbonate (DMC) to Urethanes, **2007**; to DOW Chemical.
3. Progetto Integrato EU: SOLVSAFE: "Advanced safer solvents for innovative industrial eco-processing"; Patent: "An innovative solvent for varnish, **2007**; to INCA
4. P. Tundo, F. Aricò, C. Newman, R. Sievert, H. Bevinakatti, "Cyclic Ethers", **2007**; to IMPERIAL CHEMICAL INDUSTRIES (ICI).
5. M. Selva and P. Tundo "Synthesis of mono-N-substituted functionalized anilines", Consorzio Interuniversitario Nazionale La Chimica per l'Ambiente EP 03029005.0 n. concessione 1431274-**2007**

SEMINARS AND ORAL PRESENTATIONS (upon invitation)

- 16/02/2007 Firenze (Italy) - REACH: Registration, Evaluation, and Approval of Chemicals. Un'efficace strategia europea per la tutela della salute e dell'ambiente.
- 1-2/03/2007 Pisa (Italy) – IX Congresso INCA 22/3/2006 Venice (Italy)
- 7-8/03/2007 Brussels (Belgium) – Suschem mirror group. A set of initiatives in the field of sustainable development in the frame of the FP7
- 20/03/2007 Roma (Italy) – Convegno su Tecnologie Bianche
- 22/03/2007 6° CIND Seminario Microinquinanti "Monitoraggio e circuiti di Intercalibrazione"
- 3-4/05/2007 Athens (Greece) The 4th MEGREC Board meeting was held on May 3, 2007, and the 1st MEGREC Operational Team meeting was held at the same facilities.
- 15-16/05/2007 Berlin (Germany) – EU Workshop on "Sustainable Chemistry – Implementation of a scientific concept in policy and economy"
- 21/05/2007 Venezia (Italy) Public Encounter with Sir Harold Kroto, Nobel Prize Laureate in Chemistry (1996)
- 29/05/2007 Roma (Italy) Primi Green Scuola. Prodotti 'verdi': dalle materie prime naturali al consumatore.
- 13-14/06/2007 Pdggorica (Montenegro). 1st Symposium of Chemical Society of Montenegro
- 29/06-1/07/2007 Delft (The Netherlands) Final Meeting of Cost Action D 29 on Sustainable/Green Chemistry and chemical technology
- 4-12/08/2007 Torino (Italy) – 41st IUPAC World Chemistry Congress and 44th General Assembly.
- 23-28/09/2007 Moscow (Russia) – XVIII Mendeleev Congress on General and Applied Chemistry
- 2/10/2007 Milano (Italy) Ascoltare la Scienza: dalla ricerca alla diffusione della cultura scientifica
- 3-5/10/2007 Francoforte (Germany) - EuChems
- 12-16/11/2007 La Plata (Argentina) – XV Congreso Argentino de Catálisis-4to Congreso de Catálisis del Mercosur

ACADEMIC ACTIVITIES

- President of the Interuniversity Consortium "Chemistry for Environment" (INCA; www.unive.it/inca), elected in January 2001; and re elected in March 2005.
- Director of the INCA Laboratory of Marghera.
- President of Organic and Biomolecular Chemistry Division of IUPAC
- Chairman of WP of "Green and Sustainable Chemistry" of Euchems (European Association for Chemical and Molecular Sciences)

EDITORIAL ACTIVITY

International:

- Green Chemistry, RSC (Int. Ed. Board)
- Reactive Polymers, Elsevier (Ed. Board)

National:

- Monthly Magazine for Secondary schools "Green. La Scienza al Servizio dell'Uomo e dell'Ambiente", (Direttore)
- Bulletin of the Interuniversity Consortium Chemistry for Environment "Chimica New Ambiente", (Direttore Responsabile)
- La Chimica e l'Industria, Editrice Bias S.a.s. (Ed. Board) Green Chemistry, RSC (Int. Ed. Board)

SOCIETY MEMBERSHIP

- International Union of Pure and Applied Chemistry (IUPAC)
- Italian Chemical Society
- American Chemical Society
- Royal Society of Chemistry

EVALUATION ACTIVITIES

- Member of the International Advisory Committee - Centre for Green Chemistry Monash University, Melbourne, Australia.
- Italian Representative (MIUR) in the EU Technology Platform on Sustainable Chemistry – Mirror Group.
- Incluso nelle liste degli Esperti MIUR.
- Incluso nelle liste degli Esperti MAP.

ORGANISED SEMINARS, WORKSHOPS AND CONFERENCES

- 16/2/2007 Firenze (Italy) – REACH – Registration, Evaluation and Approval of CHemicals. Un'efficace strategia europea per la tutela della salute e dell'ambiente
- 27/2/2007 Venice (Italy) – Seminario di Microinquinanti "Sistemi di monitoraggio per diossine e articolato fine"
- 1-2/3/2007 Pisa (Italy) - IX Congresso Annuale del Consorzio INCA. Verso il 7° Programma dell'Unione Europea
- 22/3/2007 Venice (Italy) – 6° CIND – Seminario Microinquinanti. Risultati del 6° Circuito di Intercalibrazione Diossine e presentazione del 7° CIND
- 23-24/3/2007 Venice (Italy) – Conference: European High Resolution GC/MS Users Meeting Applications in Environmental, Food and Feed Analysis
- 7-8/3/2007 Brussels (Belgium) – A set of initiatives in the field of sustainable development in the frame of the FP7
- 29/5/2007 Rome (Italy) – Premio Green Scuola- Prodotti 'verdi': dalle materie prime naturali al consumatore Cerimonia di Premiazione
- 2/10/2007 Milan (Italy) – (RICH-MAC 2007) Seminario: Ascoltare la Scienza: dalla ricerca alla diffusione della cultura scientifica.

COORDINATED PROJECTS

See http://www.incaweb.org/inca/pdf/Relazione_prof_Tundo2005-2007.pdf

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