CURRICULUM VITAE ET STUDIORUM

Dr. Anna Irto was born in Reggio Calabria (Italy) on 5th March 1989.

EDUCATION AND ACADEMIC CAREER

29th March 2011: **Bachelor's Degree in Chemistry** (class 21) at the University of Messina (Italy), mark 106/110.
24th October 2013: **Master's degree in Chemistry** (class LM54) at the University of Messina (Italy), mark 107/110.
12th March 2013: **qualification as chemist** at the University of Messina (Italy), mark 141/150.
1st January 2014-31st December 2016: **PhD in Chemical Sciences with mention of "Doctor Europaeus" (XXIX Cycle)** at the University of Messina (Italy), thesis discussed on the 15th February 2017 in English language entitled "BINDING ABILITY OF SOME COMMERCIALLY AVAILABLE AND SYNTHESIZED LIGANDS TOWARDS METAL CATIONS OF ENVIRONMENTAL AND BIOLOGICAL INTEREST".
4th September 2017-3rd September 2018: **post-Doctoral research grant** (CUN 03 area, SSD CHIM/01), project "Multiple equilibria in natural and biological fluids: from speciation to selective sequestration".
1st October 2018-30th September 2019, 10th October 2019-9th October 2020, 5th November 2020-4th November 2021: **3 post-Doctoral research grants** (CUN 03 area, SSD CHIM/01), project "Analysis of classes of polyfunctional ligands for the speciation and selective sequestration of metal and organometal cations in natural and biological systems".
31st December 2021: **Fixed-term Researcher – type A** at the CHIBIOFARAM Department of the University of Messina (Italy), PON "RESEARCH AND INNOVATION" 2014-2020, SC 03/A1 - SSD CHIM/12 (Environmental and Cultural Heritage Chemistry), GREEN topic, three-years research project "Recovery, reuse and enhancement of processing waste citrus fruits".

RESEARCH PERIODS ABROAD

10th April–30 September 2015: **visiting PhD scholar** at the Universidade de Lisboa (Portugal), supervisor: Prof. M. A. Santos. Activities: synthesis, purification and characterization of 3-hydroxy-4-pyridinones, compounds potentially employed for the remediation of toxic metal cations from environmental and biological matrices.
30th April-22nd May 2018: **research activity** at the Friedrich-Schiller-Universitàt Jena, Jena (Germany), supervisor: Prof. Winfred Plass. Italian-German project MIUR-DAAD Joint Mobility Program entitled: "Metal uptake by Azotobacter Vinelandii metallophores: a thermodynamic approach" 2018-2020. Activities: synthesis, purification and characterization of metallophores, compounds potentially exploitable for metals removal from environmental and biological matrices.

STAGE EXPERIENCES

March-December 2010: **Stage** at the Regional Agency for Environmental Protection of Calabria (ARPACaL), Chemical-Toxicology Laboratory, Department of Reggio Calabria (Italy), tutor: Dr. G. Marino. Activities: sampling of drinking water from aquifers in areas with intensive agriculture, analysis of chemical - physical parameters, dosage of metals by Atomic Emission Spectrometry with

Messina (Italy), 31st May 2022

Inductive Coupling Plasma (ICP-OES) and determination of organochlorine pesticides by Gas Chromatography (GC).
A.Y. 2008/2009: **Stage** at the University of Messina (Italy), Department of Chemical Sciences, supervisor: Prof. F. Crea. Activity: determination of thermodynamic parameters for the formation of Ni^{2+}/glycine complexes, using electrochemical techniques.

AWARDS

1. "***NJC***" (New Journal of Chemistry) award for the best poster presentation, contribution entitled: "Bis-3-hydroxy-4-pyridinones: From the synthesis to the complexation with Al^{3+} and Fe^{3+} and the biological assays", authors: A. Irto, K. Chand, R.M. Cigala, F. Crea, L. Gano, C. De Stefano, S. Sammartano, M.A. Santos, awarded in Dijon (France) during the *International Symposium on Metal Complexes 2017* (*ISMEC 2017*).
2. "***Fernando Pulidori Prize***", award reserved to young researchers for their research in the fields of the thermodynamic and/or kinetic studies on solution equilibria, received in Debrecen (Hungary) during the *International Symposium on Metal Complexes 2019* (ISMEC 2019).

PARTICIPATION TO GROUPS AND COMMITTEES

26th April 2014-present: **member of the Order of Chemists and Physicists** of Calabria, section A;
18th April 2014-present: **member of the Analytical Chemistry Division of the Italian Chemical Society**, Sicily Section;
9th-10th February 2017: **member of the organizing committee** of the "*Workshop of the Sicily and Calabria Sections of the Italian Chemical Society 2016-2017*";
3rd December 2020: **member of the organizing committee** of the "*Workshop of the Sicily Section of the Italian Chemical Society 2020*";
25th February 2021-present: **member of the EUChemS-DAC Sample Preparation Study Group and Network**, a group that promotes the collaboration and exchange of information between research groups regarding the methods of samples preparation;.
24th January 2022-present: **member of the Environmental and Cultural Heritage Chemistry Division of the Italian Chemical Society**.

PARTICIPATION TO PROJECTS

20th June 2016-5th February 2020: participant in the research program within the **PRIN 2015 project** - Multiple equilibria in natural and biological fluids: from speciation to selective sequestering. Scientific coordinator: Prof. C. Sgarlata. Scientific Responsible: Prof. C. De Stefano. PROJECT ADMITTED FOR FUNDING.
1st October 2018-30th September 2020: member of the working group within the **ARCADIA project** - smARt materials for landfill leaChAte remeDIAtion. SSD: CHIM/01 - ANALYTICAL CHEMISTRY. Scientific coordinator: Prof. C. De Stefano. PROJECT ADMITTED FOR FUNDING.
22nd June 2020-present: member of **COST Action CA18202**, NECTAR — Network for Equilibria and Chemical Thermodynamics Advanced Research, supported by COST (European Cooperation in Science and Technology). Coordinator: Prof. D. Milea. PROJECT ADMITTED FOR FUNDING.

Messina (Italy), 31st May 2022

PARTICIPATION TO SCHOOLS AND COURSES

25th–30th September 2016: **10th National School of Analytical Chemistry for PhD Students**, organized by the Analytical Chemistry Division of Italian Chemical Society.
28th August–2nd September 2017: **3rd Summer School of Bioinorganic Medicinal Chemistry** organized by the University of Cagliari (Italy), Department of Chemical and Geological Sciences.
27th November 2017–25th July 2018: **Course for the acquisition of 24 credits (CFU) for FIT access** at the University of Messina (Italy). Exams: *FUNDAMENTALS OF GENERAL EDUCATION* (6 CFU, SSD: M-PED/01, mark 30/30); *FUNDAMENTALS OF CULTURAL ANTHROPOLOGY* (6 CFU, SSD: M-DEA/01, mark 30/30); FUNDAMENTALS OF DEVELOPMENTAL PSYCHOLOGY (6 CFU, SSD: M-PSI/04, mark 20/30); GENERAL TEACHING (6 CFU, SSD: M-PED/03, mark 30/30).
30th November–3rd December 2020: **7th National School of Environmental and Cultural Heritage Chemistry** organized by the Environmental and Cultural Heritage Chemistry Division of Italian Chemical Society.
5th–6th July 2021: Online **Machine Learning for Multivariate Data Analysis course**, organized by the PhD School in Chemical, Geological and Environmental Sciences at University of Milano-Bicocca (Italy).
24th–26th November 2021: **6th National School of Environmental Monitoring – "Contaminated Sites"**, organized by the Environmental and Cultural Heritage Chemistry Division of Italian Chemical Society.

TEACHING ACTIVITY

Supplementary teaching
S.Y. 2015/2016: **tutoring activities** within the "Scientific Degrees Project" (PLS) in Chemistry at the University of Messina (Italy);
A.Y. 2015/2016 and 2016/2017: **n. 120 hours of specialist-didactic tutoring**, **n. 54 hours of information tutoring, didactic activities** carried out in the context of "Unime - Summer Orientation Campus", at the University of Messina (Italy);
A.Y. 2018/2019, 2019/2020, 2020/21: **total n. 180 hours** (60 hours per year) **of specialist-didactic tutoring in Chemistry** at the "Mediterranea" University of Reggio Calabria (Italy);
1st October 2019-present: Expert (**Cultore della materia**) **for the "Environmental Chemistry"** subject (SSD CHIM/12), period 2019/2022, at the CHIBIOFARAM Department of the University of Messina (Italy);
1st October 2021-present: Expert (**Cultore della materia**) **for the "Analytical Chemistry" subject** (SSD CHIM/01), three-year period 2021/2024, at the CHIBIOFARAM Department of the University of Messina (Italy);
24th March 2022: **tutoring activities** within the "Training for the Chemistry Games" project organzed by the Sicily Section of Italian Chemical Society.

Exam commissions
Member of the following **exam commissions**:

Messina (Italy), 31st May 2022

Environmental Chemistry (SSD CHIM/12), Cultural Heritage Chemistry (SSD CHIM/12) and Analytical Chemistry (SSD CHIM/01), in the Bachelor's Degree Course in Chemistry at the University of Messina.

SCIENTIFIC ACTIVITY

The scientific activity of Dr. Anna Irto is mainly focused on the determination of thermodynamic parameters of protonation, hydrolysis and metal-ligand complex formation in aqueous solution, with particular interest to the speciation of ligands with different nature, such as organic and inorganic molecules with low, medium and high molecular weight, and metal and organometal cations of environmental and biological interest. Research experiences abroad allowed Dr. Anna Irto to acquire a good experience in the field of design, synthesis, purification and characterization by ^{1}H and ^{13}C NMR spectroscopy and ESI-MS spectrometry of new potential chelating agents such as 3-hydroxy - 4-pyridinones and metallophores, potentially exploitable for the removal of metals from environmental and biological matrices. Furthermore, her scientific activity is also aimed to the synthesis, characterization and evaluation of new ecofriendly materials for the conservation of stone of historical-artistic interest and for potential environmental applications, in collaboration with a group Ibea Research Department of the Departamento de Química Analítica, Universidad del País Vasco (EHU/UPV), Bilbao (Spain). She has also focused her attention to archaeometry, participating to the investigations performed on a group of *tesserae* coming from mosaics found in the archaeological site of Villa San Pancrazio in Taormina, which includes two Roman Domus from the Imperial age, for the purpose to provide an analytical support to archaeological studies, to obtain information on the raw materials used to perform the *tesserae* and on the production technology. Dr. Anna Irto has also started to work for the development of analytical methods for the determination and quantification of organic residues of lipidic nature, such as intact or free fatty acids and their methyl esters, coming from foods, balms and perfumes found in amphorae, vases, jugs and ointments of archaeological relevance dating to the Late Imperial Age. In the last months, she is also working for recovery, reuse and enhancement of manufacturing wastes from bergamot fruit to produce new materials for the possible sensing and sequestration of pollutants from environmental matrices.
The research activity of Dr. Anna Irto is documented by n. 24 articles published in international ISI journals, n. 1 paper in the journal of the Italian Chemical Society "La Chimica e L'Industria" and 36 contributions to national and international congresses, including an invited lecture of 30 minutes in English language as recognition of the "*Fernando Pulidori Prize*" achievement, during the *International Symposium on Metal Complexes 2019* (*ISMEC 2019*).

SCIENTIFIC COLLABORATIONS

Prof. M. A. Santos, Prof. S. Chaves, Dr. K. Chand, Prof. L. Gano - Universidade de Lisboa (Portugal);
Prof. P. Buglyò, University of Debrecen (Hungary);
Prof. A. Pettignano, Dr. S, Cataldo, Dr. N. Muratore - University of Palermo (Italy);
Prof. S. Materazzi - "La Sapienza" University of Rome (Italy);
Dr. Ol. Gómez-Laserna, P. Irizar, Dr. L. Kortazar, Prof. L. Ruiz-Rubio, Prof. I. Martinez-Arkarazo, Prof. M. Ángeles Olazabal, Dr. I. Costantini, Dr. A. Cuesta, Dr A. Pintor-Rial - Universidad del País Vasco (EHU/UPV), Bilbao (Spain);
Dr. Alessio Toscano Raffa - Institute for Archaeological and Monumental Heritage, CNR Catania (Italy);

Messina (Italy), 31st May 2022

Prof. L. Campagna, Dr. M. Venuti, M. Morganti - DICAM, University of Messina (Italy).

BIBLIOMETRIC PARAMETERS (SCOPUS)

23 products (mean IF = 4.56); H-index = 7; 100 citations; 4.543 cit. per product.
Total Impact Factor = 113.58.
Scopus author ID: 56473656000.
ORCID author ID: 0000-0002-9023-2897.

PUBLICATIONS

- **Articles on ISI journals**

[1] R. M. Cigala, C. De Stefano, **A. Irto**, D. Milea, S. Sammartano, Thermodynamic Data for the Modeling of Lanthanoid (III) Sequestration by Reduced Glutathione in Aqueous Solution, *J. Chem. Eng. Data*, 2015, 60 (*1*), 192-201, DOI: 10.1021/je500961u.

[2] F. Crea, C. De Stefano, **A. Irto**, D. Milea, A. Pettignano, S. Sammartano, Modeling the acid-base properties of molybdate(VI) in different ionic media, ionic strengths and temperatures, by EDH, SIT and Pitzer equations, *J. Mol. Liq.* 2017, 229, 15–26, DOI: 10.1016/j.molliq.2016.12.041.

[3] C. Bretti, R. M. Cigala, F. Crea, C. De Stefano, G. Gattuso, **A. Irto**, G. Lando, D. Milea, S. Sammartano, Thermodynamic properties of O-donor polyelectrolytes: determination of the acid-base and complexing parameters in different ionic media and temperatures, *J. Chem. Eng. Data* 2017, DOI: 10.1021/acs.jced.7b00101.

[4] P. Cardiano, R. M. Cigala, F. Crea, F. Giacobello, O. Giuffrè, **A. Irto**, G. Lando, S. Sammartano, Sequestration of Aluminium(III) by different natural and synthetic organic and inorganic ligands in aqueous solution, *Chemosphere* 2017, 186, 535-545, DOI: 10.1016/j.chemosphere.2017.08.015.

[5] **A. Irto**, P. Cardiano, K. Chand, R. M. Cigala, F. Crea, C. De Stefano, L. Gano, S. Sammartano, M.A. Santos, Bifunctional 3-hydroxy-4-pyridinones as effective aluminium chelators: synthesis, solution equilibrium studies and in vivo evaluation, *J. Inorg. Biochem.* 2018, *186*, 116-129, DOI: 10.1016/j.jinorgbio.2018.05.017.

[6] C. Bretti, P. Cardiano, R. M. Cigala, C. De Stefano, **A. Irto**, G. Lando, S. Sammartano, Exploring Various Ligand Classes For The Efficient Sequestration Of Stannous Cations In The Environment, *Sci. Total. Environ.* 2018, 643, 704-714, DOI: 10.1016/j.scitotenv.2018.06.241.

[7] **A. Irto**, P. Cardiano, K. Chand, R. M. Cigala, F. Crea, C. De Stefano, L. Gano, G. Gattuso, S. Sammartano, M. A. Santos, New bis-(3-hydroxy-4-pyridinone)-NTA-derivative: Synthesis, binding ability towards Ca^{2+}, Cu^{2+}, Zn^{2+}, Al^{3+}, Fe^{3+} and biological assays, *J. Mol. Liq.* 2018, 272, 609-624, DOI: 10.1016/j.molliq.2018.09.107.

[8] R. M. Cigala, F. Crea, C. De Stefano, **A. Irto**, S. Sammartano, Use of Gantrez copolymers as potential chelating agent for the selective sequestration of metal ions. Studies of the interactions in aqueous solution at different ionic strengths and temperatures, *J. Chem. Eng. Data* 2018, 643, 704-714, DOI: 10.1021/acs.jced.8b00655.

Messina (Italy), 31st May 2022

[9] **A. Irto**, P. Cardiano, K. Chand, R. M. Cigala, F. Crea, C. De Stefano, L. Gano, G. Gattuso, S. Sammartano, M. A. Santos, A new bis-(3-hydroxy-4-pyridinone)-DTPA-derivative: Synthesis, complexation of di-/tri-valent metal cations and in vivo M^{3+} sequestering ability, *J. Mol. Liq*. 2019, 281, 280-294, DOI: 10.1016/j.molliq.2019.02.042.

[10] **A. Irto**, P. Cardiano, S. Cataldo, K. Chand, R. M. Cigala, F. Crea, C. De Stefano, G. Gattuso, N. Muratore, A. Pettignano, S. Sammartano, M. A. Santos, Speciation studies of bifunctional 3-hydroxy-4-pyridinone ligands in the presence of Zn^{2+} at different ionic strengths and temperatures, *Molecules* 2019, *24*(22), 4084, DOI: 10.3390/molecules24224084.

[11] F. Crea, C. De Stefano, **A. Irto**, G. Lando, S. Materazzi, D. Milea, A. Pettignano, S. Sammartano, Understanding the solution behavior of epinephrine in the presence of toxic cations: Thermodynamic investigation in different experimental conditions, *Molecules* 2020, *25*(3), 511, DOI: 10.3390/molecules25030511.

[12] R. M. Cigala, F. Crea, C. De Stefano, **A. Irto**, D. Milea, S. Sammartano, Thermodynamic Behavior of Polyalcohols and Speciation Studies in the Presence of Divalent Metal Cations: *J. Chem. Eng. Data* 2020, *65*(5), 2805-2812, DOI: 10.1021/acs.jced.0c00120.

[13] R. M. Cigala, F. Crea, C. De Stefano, **A. Irto**, S. Sammartano, Nature as Resource. Thermodynamic characterization of natural and synthetic polymers and their sequestering ability towards some bivalent metal cations, *J. Chem. Thermodyn.* 2020, 150, 106205, DOI: 10.1016/j.jct.2020.106205.

[14] C. Bretti, P. Cardiano, **A. Irto**, G. Lando, D. Milea, S. Sammartano, Interaction of N-Acetyl-L-cysteine with Na^{+}, Ca^{2+}, Mg^{2+} and Zn^{2+}. Thermodynamic aspects, chemical speciation and sequestering ability in natural fluids, *J. Mol. Liq.* **2020**, 319, 114164, DOI: 10.1016/j.molliq.2020.114164.

[15] **A. Irto***, P. Cardiano, K. Chand, R. M. Cigala, F. Crea, C. De Stefano, S. Sammartano, M. A. Santos, Complexation of environmentally and biologically relevant metals with bifunctional 3-hydroxy-4-pyridinones, *J. Mol. Liq.* 2020, 319, 114349, DOI: 10.1016/j.molliq.2020.114349. (*corresponding author)

[16] O. Gómez-Laserna, P. Irizar, G. Lando, L. Kortazar, **A. Irto**, L. Ruiz-Rubio, I. Martinez-Arkarazo, P. Cardiano, M. Á. Olazabal, Design of Epoxy-Silica Hybrids Based on Cycloaliphatic Diol of Natural Origin for Conservation of Lithic Materials, *Prog. Org. Coat.* 2021, 151, 106028, DOI: 10.1016/j.porgcoat.2020.106028.

[17] A. Gigliuto, R. M. Cigala, **A. Irto**, M. R. Felice, A. Pettignano, D. Milea, S. Materazzi, C. De Stefano, F. Crea, The Solution Behavior of Dopamine in the Presence of Mono and Divalent Cations: A Thermodynamic Investigation in Different Experimental Conditions, *Biomolecules* 2021, 11*(9)*, 1312, DOI: 10.3390/biom11091312.

[18] F. Crea, A. Gigliuto, C. De Stefano; **A. Irto**: Behavior of Ofloxacin antibacterial in aqueous solution: Protonation constants, total and intrinsic solubility in $NaCl_{(aq)}$ at different temperatures: *J. Sol. Chem.* 2021, 50, 1236–1257, DOI: 10.1007/s10953-021-01114-2.

Messina (Italy), 31st May 2022

[19] C. Bretti, R. Di Pietro, P. Cardiano, O. Gomez-Laserna, **A. Irto**, G. Lando, C. De Stefano, Thermodynamic solution properties of a biodegradable chelant (L-glutamic-N,N-diacetic acid, L-GLDA) and its sequestering ability towards Cd^{2+}, *Molecules* 2021, 26(*23*), 7087, DOI: 10.3390/molecules26237087.

[20] **A. Irto***, P. Cardiano, K. Chand, R.M. Cigala, F. Crea, C. De Stefano, M. A. Santos*, Bifunctional 3-hydroxy-4-pyridinones as potential selective iron(III) chelators: solution studies and comparison with other metals of biological and environmental relevance, *Molecules* 2021, 26(*23*), 7280, DOI: 10.3390/molecules26237280. (*corresponding author)

[21] O. Gómez-Laserna, **A. Irto**, P. Irizar, G. Lando, C. Bretti, I. Martinez-Arkarazo, L. Campagna, P. Cardiano, Non-invasive approach to investigate the mineralogy and production technology of the mosaic tesserae from the Roman domus of Villa San Pancrazio (Taormina, Italy), *Crystals* 2021, 11(*11*), 1423, DOI: 10.3390/cryst11111423.

[22] A. Gigliuto, R.M. Cigala, **A. Irto**, M.R. Felice, A. Pettignano, C. De Stefano, F. Crea, The effect of metal cations on the aqueous behavior of dopamine. Thermodynamic investigation of the binary and ternary interactions with Cd^{2+}, Cu^{2+} and UO_2^{2+} in NaCl at different ionic strengths and temperatures. *Molecules* 2021, 26(*24*), 7679, DOI: 10.3390/molecules26247679.

[23] M. A. Santos, **A. Irto**, P. Buglyó, S. Chaves, Hydroxypyridinone-based metal chelators towards ecotoxicity: remediation and biological mechanisms, *Molecules* 2022, 27(*6*), 1966, DOI: 10.3390/molecules27061966.

[24] P. Irizar, **A. Irto**, I. Martinez-Arkarazo, M.Á. Olazabal, P. Cardiano, O. Gomez-Laserna, Sugar-derived bio-based resins as platforms for the development of multifunctional hybrids with potential application for stone conservation, *Mater. Today Commun.* 2022, 31, 103662, DOI: 10.1016/j.mtcomm.2022.103662.

[25] **A. Irto***, G. Micalizzi*, C. Bretti, V. Chiaia, L. Mondello, P. Cardiano, LIPIDS IN ARCHAEOLOGICAL POTTERY: A REVIEW ON THEIR SAMPLING AND EXTRACTION TECHNIQUES, *Molecules* 2022, 27, 3451, DOI: 10.3390/molecules27113451. (*corresponding author)

[26] R.M. Cigala, C. De Stefano, **A. Irto**, P. Lanzafame, G. Papanikolaou, F. Crea, Environmental behaviour of a pesticide metabolite, the AMPA. Sequestration of Ca^{2+}, Mg^{2+}, Cu^{2+}, Zn^{2+} and Al^{3+}, *Chemosphere* 2022 (submitted).

- **Article on Journal of Italian Chemical Society**

[I] **A. Irto**, NEW M-CHELATING AGENTS WANTED! La Chimica e l'Industria online, January/February **2020,** year IV, 1, 54-57. ISSN 2283-544X, DOI: 10.17374/CI.2020.102.1.54.

- **Communications to national and international congresses**

[C1] F. Crea, C. De Stefano, **A. Irto**, G. Lando, D. Milea, S. Sammartano: Speciation of Lanthanoids(III) in aqueous solution. Sequestration by Reduced Glutathione. *23rd National*

Messina (Italy), 31st May 2022

Congress of Analytical Chemistry Division of Italian Chemical Society, Poster Presentation (P77, **coauthor**). Elba Island (Italy), 16th-20th September 2012.

[C2] C. Bretti, R. M. Cigala, C. De Stefano, **A. Irto**, G. Lando: Thermodynamic parameters and binding ability towards Ca^{2+}, Mg^{2+} and Zn^{2+} of some polyelectrolytes. *25th National Congress of Italian Chemical Society*. Oral Communication (ANA-O71, **coauthor**). Arcavacata of Rende (Italy), 7th-12th September 2014.

[C3] C. Bretti, R. M. Cigala, C. De Stefano, **A. Irto**, G. Lando, S. Sammartano: Parametri termodinamici di formazione di complessi dell'Al^{3+} con leganti O-donatori (Thermodynamic parameters for the formation of Al^{3+}/O-donor ligands complexes). *Congress of the Calabria and Sicily Sections of Italian Chemical Society*. Oral Communication (O16, **speaker**). Catanzaro (Italy), 3rd-4th December 2015.

[C4] F. Crea, C. De Stefano, C. Foti, **A. Irto**, D. Milea, A. Pettignano, S. Sammartano: Modelling the dependence on medium and ionic strength of molybdate acid base properties, and its interactions with phytate. *XXVII International Symposium on Metal Complexes - ISMEC 2016*. Oral Communication (**coauthor**). Barcelona (Spain), 7th-10th June 2016.

[C5] K. Chand, R. M. Cigala, **A. Irto**, F. Crea, C. De Stefano, S. Sammartano, M. A. Santos: 3-hydroxy-4-piridinone derivatives: synthesis, acid - base properties and interactions with Al^{3+}. *26th Congress of Analytical Chemistry Division of the Italian Chemical Society*. Oral Communication (EQUI-4, **speaker**). Giardini Naxos (Italy), 18th-22nd September 2016.

[C6] C. Bretti, R. M. Cigala, G. Gattuso, **A. Irto**, G. Lando, N. Manganaro, S. Sammartano: Acid base properties of water soluble oxacalix[4]arenes and thermodynamics of omocharged interaction with Paraquat dication. *26th Congress of Analytical Chemistry Division of the Italian Chemical Society*. Poster Presentation (P91, **coauthor**). Giardini Naxos (Italy), 18th-22nd September 2016.

[C7] P. Cardiano, C. Foti, O. Giuffrè, **A. Irto**, D. Milea: Sequestering ability of Diethylenetriamine-N,N,N',N'',N''-pentakis-(methylene phosphonic acid) towards alkyltin(IV) compounds. *26th Congress of Analytical Chemistry Division of the Italian Chemical Society*. Poster Presentation (P95, **corresponding author**). Giardini Naxos (Italy), 18th-22nd September 2016.

[C8] K. Chand, R.M. Cigala, F. Crea, C. De Stefano, **A. Irto**, S. Sammartano, M. A. Santos: Speciazione di bis-3-idrossi-4-piridinoni in presenza di cationi metallici bivalenti e trivalenti (Speciation of bis-3-hydroxy-4-pyridinones in the presence of divalent and trivalent metal cations). *Workshop of Sicily and Calabria Sections of the Italian Chemical Society 2016-2017*. Poster Presentation (P-16, **corresponding author).** Messina (Italy), 9th-10th February 2017.

[C9] **A. Irto**, K. Chand, R. M. Cigala, F. Crea, L. Gano, C. De Stefano, S. Sammartano, M. A. Santos: Bis-3-hydroxy-4-pyridinones: From the synthesis to the complexation with Al^{3+} and Fe^{3+} and the biological assays. *International Symposium on Metal Complexes 2017 (ISMEC 2017)*. Poster Presentation (P40, **corresponding author**). Dijon (France), 11th-15th June 2017.

[C10] C. Bretti, R.M. Cigala, F. Crea, C. De Stefano, G. Gattuso, **A. Irto**, G. Lando, D. Milea, S. Sammartano. Acid-Base and Chelating Properties of Gantrez Copolymers. *26th National Congress of Italian Chemical Society 2017*. Oral Communication (ANA-OR16, **coauthor**). Paestum (Italy), 10th-14th September 2017.

Messina (Italy), 31st May 2022

[C11] F. Crea, C. De Stefano, **A. Irto**, S. Sammartano. Speciation of Al^{3+} in the presence of ligands of industrial, biological and environmental interest. *26th National Congress of Italian Chemical Society 2017*. Poster Presentation (ANA-PO32, **corresponding author**). Paestum (Italy), 10th-14th September 2017.

[C12] **A. Irto**, P. Cardiano, K. Chand, R. M. Cigala, F. Crea, C. De Stefano, S. Sammartano, M. A. Santos: Binding ability of bifunctional 3-hydroxy-4-pyridinone ligands towards divalent metal cations of biological interest. *International Symposium on Metal Complexes 2018 (ISMEC 2018)*. Poster Presentation (P23, **corresponding author**). Florence (Italy), 3rd-7th June 2018.

[C13] C. Bretti, P. Cardiano, R. M. Cigala, C. De Stefano, **A. Irto**, G. Lando, S. Sammartano: Exploring various ligand classes for the efficient sequestration of stannous cations in the environment. *27th Congress of Analytical Chemistry Division of the Italian Chemical Society*. Oral Communication (O3-EQ, **coauthor**). Bologna (Italy), 16th-20th September 2018.

[C14] P. Cardiano, K. Chand, R. M. Cigala, F. Crea, C. De Stefano, G. Gattuso, **A. Irto**, S. Sammartano, M. A. Santos: Speciation study of a bis-(3-hydroxy-4-pyridinone) towards M^{2+}. *27th Congress of Analytical Chemistry Division of the Italian Chemical Society*. Flash Communication in English language (**speaker**) + Poster Presentation (F2-EQ, **corresponding author**). Bologna (Italy), 16th-20th September 2018.

[C15] R. M. Cigala, F. Crea, C. De Stefano, **A. Irto**, S. Sammartano: Proprietà acido-base e reattività dei polialcol (Acid-base properties and reactivity of polyalcohols). *Congress of the Calabria and Sicily Sections of Italian Chemical Society 2019*. Poster Presentation (P12, **coauthor**). Palermo (Italy), 1st-2nd March 2019.

[C16] **A. Irto**, P. Cardiano, K. Chand, R. M. Cigala, F. Crea, C. De Stefano, S. Sammartano, M. A. Santos: Studio di speciazione di un legante 3-idrossi-4-piridinonico in presenza di un catione metallico di interesse biologico (Speciation study of a 3-hydroxy-4-pyridinone ligand in th presence of a metal cation of biological interest). *Congress of the Calabria and Sicily Sections of Italian Chemical Society 2019*. Oral Communication (OC13, **speaker**). Palermo (Italy), 1st-2nd March 2019.

[C17] R. M. Cigala, F. Crea, C. De Stefano, **A. Irto**, S. Sammartano, Speciation studies of Fe^{3+} in fairly concentrated solutions and enhancement of hydrolysis through the formation of mixed hetero-metal species: Fe^{3+}/Al^{3+}. *International Symposium on Metal Complexes 2019 (ISMEC 2019)*. Poster Presentation (P5, **coauthor**). Debrecen (Hungary), 11th-14th June 2019.

[C18] **A. Irto**, P. Cardiano, K. Chand, R.M. Cigala, F. Crea, C. De Stefano, G. Gattuso, S. Sammartano, M.A. Santos, Thermodynamic parameters for the M^{2+}/bifunctional 3-hydroxy-4-pyridinones complex formation at different experimental conditions. *International Symposium on Metal Complexes 2019 (ISMEC 2019)*. Invited Lecture English language (Pulidori lecture 1, **speaker)**. Debrecen (Hungary), 11th-14th June 2019.

[C19] P. Irizar, O. Gomez-Laserna, **A. Irto**, G. Lando, C. Bretti, R.M. Cigala, I. Martinez-Arkarazo, M. Olazabal, P. Cardiano, A novel spectroscopical approach to assess the synthesis and characterization of BPA-free epoxy resins designed for stone conservation. *Workshop Functional Materials for Cultural Heritage (Fun4Heritage) 2019*. Poster Presentation (P6, **corresponding author**). Matera (Italy), 5th-6th September 2019.

Messina (Italy), 31st May 2022

[C20] A. Gigliuto, R.M. Cigala, F. Crea, **A. Irto**, D. Milea, S. Sammartano, Investigation on the thermodynamic properties of two antibacterial drugs in aqueous solution. *28th Congress of Analytical Chemistry Division of the Italian Chemical Society*. Poster Presentation (P126, **coauthor**). Bari (Italy), 22nd-26th September 2019.

[C21] G. Lando, O. Gomez-Laserna, A. Toscano Raffa, I. Costantini, F. Crea, **A. Irto**, A. Cuesta, I. Martinez-Arkarazo, M. Venuti, L. Campagna, P. Cardiano, Archaeometric study of Roman mosaic tesserae from the archaeological area of Villa San Pancrazio (Taormina, Italy): EDXRF and Raman spectroscopy analyses for dating and manufacturing assessment. *28th Congress of Analytical Chemistry Division of the Italian Chemical Society*. Poster Presentation (P108, **coauthor**). Bari (Italy), 22nd-26th September 2019.

[C22] R.M. Cigala, C. Bretti, F. Crea, **A. Irto**, G. Lando, D. Milea, C. De Stefano, S. Sammartano, Natural and synthetic polymers: characterization of acid-base behaviour and binding properties. *28th Congress of Analytical Chemistry Division of the Italian Chemical Society*. Oral Communication (O2 SES2, **coauthor**). Bari (Italy), 22nd-26th September 2019.

[C23] **A. Irto**, P. Cardiano, K. Chand, R.M. Cigala, F. Crea, C. De Stefano, S. Sammartano, M.A. Santos, Acid-base properties and binding ability of an aspartic acid derivative of 3-hydroxy-4-pyridinone towards biological relevant metal cations. *28th Congress of Analytical Chemistry Division of the Italian Chemical Society*. Oral Communication (O3 SES1, **speaker**). Bari (Italy), 22nd-26th September 2019.

[C24] P. Cardiano, **A. Irto**, K. Chand, R.M. Cigala, F. Crea, C. De Stefano, G. Gattuso, S. Sammartano, M.A. Santos, Binding and sequestering ability of two 3-hydroxy-4-pyridinones towards metal cations of biological and environmental interest. 20th *European Meeting on Environmental Chemistry*. Poster Presentation (5P56, **coauthor**). Lodz (Poland), 2nd-5th December 2019.

[C25] P. Cardiano, R.M. Cigala, F. Crea, C. De Stefano, **A. Irto**, D. Milea, S. Sammartano, Nature as Resource. Characterization of natural and synthetic polymers: acid-base properties and sequestering ability towards bivalent metal cations. *20th European Meeting on Environmental Chemistry*. Poster Presentation (5P57, **coauthor**). Lodz (Poland), 2nd-5th December 2019.

[C26] O. Gomez-Laserna, G. Lando, P. Irizar, **A. Irto**, C. Bretti, I. Martinez-Arkarazo, L. Campagna, P. Cardiano, THE ROMAN MOSAIC TESSERAE FROM VILLA SAN PANCRAZIO (TAORMINA, ITALY): EDXRF AND RAMAN SPECTROSCOPY ANALYSES FOR MANUFACTURING ASSESSMENT, *14th International GeoRaman conference*. Comunicazione per GeoRaman 2020 (**coauthor**). Bilbao (Spain), 2nd-5th November 2020.

[C27] R.M. Cigala, F. Crea, C. De Stefano, A. Gigliuto, **A. Irto**, Speciation studies of antibacterial drugs. *DOCTOCHEM, third edition*. Oral Communication (L16, **coauthor**). Microsoft Teams, 19th-20th November 2020.

[C28] A. Gigliuto, C. Bretti, P. Cardiano, R.M. Cigala, F. Crea, C. De Stefano, **A. Irto**, G. Lando, D. Milea, Studi termodinamici in soluzione acquosa di due importanti farmaci antibatterici (Thermodynamic studies in aqueous solution of two important antibacterial drugs). *Workshop of Sicily Section of the Italian Chemical Society 2020*. Oral Communication (OC8, **coauthor**). Microsoft Teams, 3rd December 2020.

Messina (Italy), 31st May 2022

[C29] **A.Irto**, P. Cardiano, K. Chand, R.M. Cigala, F. Crea, S. Sammartano, M. A. Santos, Capacitá complessante e sequestrante di 3-idrossi-4-piridinoni nei confronti di un catione metallico di interesse biologico (Complexing and sequestering ability of 3-hydroxy-4-pyridonones towards a metal cation of biological relevance), *Workshop of Sicily Section of the Italian Chemical Society 2020*. Poster Presentation (P18, **corresponding author**). Microsoft Teams, 3rd December 2020.

[C30] A. Gigliuto, C. Alessandrello, P. Cardiano, R.M. Cigala, **A. Irto**, C. De Stefano, F. Crea, Study of the formation of complexes between dopamine and different cations of biological and environmental interest in NaCl aqueous solution at different ionic strengths and temperatures, *International Symposium on Metal Complexes 2021 (ISMEC 2021)*. Poster Presentation (P25, **coauthor**). Microsoft Teams, 16th-18th June 2021.

[C31] **A. Irto,** P. Cardiano, K. Chand, R.M. Cigala, F. Crea, Concetta De Stefano, M.A. Santos, Speciation studies of bifunctional alkyl-(amino-carboxylic)-3- hydroxy-4-pyridinones in the presence of Fe^{3+}, *International Symposium on Metal Complexes 2021 (ISMEC 2021)*. Flash Communication in English language (**speaker**) + Poster Presentation (P28, **corresponding author**). Microsoft Teams, 16th-18th June 2021.

[C32] **A. Irto**, P. Cardiano, K. Chand, R.M. Cigala, F. Crea, C. De Stefano, M.A. Santos, Thermodynamic parameters on the interaction of divalent and trivalent metal cations with 3-hydroxy-4-pyridinones, *27th National Congress of Italian Chemical Society*, Oral Communication (ANAOR091, **corresponding author**). Ibrida.io platform, 14th-23rd September 2021.

[C33] **A. Irto**, G. Micalizzi, C. Bretti, M. Morganti, M. Venuti, L. Campagna, C. De Stefano, L. Mondello, P. Cardiano, Analysis on organic residues from Hellenistic and Roman pottery in ancient Taormina: the contexts from the domus in Villa San Pancrazio, *27th National Congress of Italian Chemical Society*, Poster Presentation (ANAPO062, **coauthor**). Ibrida.io platform, 14th-23rd September 2021.

[C34] R.M. Cigala, F. Crea, C. De Stefano, A. Gigliuto, **A. Irto**, Speciation studies of biological molecules with metals, *DOCTOCHEM, fourth edition*. Oral Communication (L3, **coauthor**). Messina (Italy), 25th-26th November 2021.

[C35] **A. Irto**, P. Cardiano, K. Chand, R.M. Cigala, F. Crea, C. De Stefano, M.A. Santos, 3-Hydroxy-4-Pyridinone as Potential Chelating Agent for the Remediation of Ecotoxic Metals from Environmental Matrices, *21st European Meeting on Environmental Chemistry (EMEC21)*. Oral Communication (**corresponding author**). Novi Sad (Serbia), 30th November-3rd December 2021.

[C36] P. Irizar, A. Pintor-Rial, **A. Irto**, M.A Olazabal, I. Martinez-Arkarazo, P. Cardiano, O. Gómez-Laserna, BPA-free Epoxy–Silica Hybrid Materials of Natural Origin for Stone Conservation: Inhibition Potential Against Biocolonization, *21st European Meeting on Environmental Chemistry (EMEC21)*. Oral Communication (**coauthor**). Novi Sad (Serbia), 30th November-3rd December 2021.

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