FRANCESCA FORTI

CURRICULUM VITAE

Date of birth / **14/02/1997** Age / **27**
Place of birth / **BOLOGNA (BO)**
Nationality/ citizenship / **Italy**
BOLOGNA (BO)
Driving licence / **B** / **Car available**

ID / **5000529** updated on **28/07/24**

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FOREIGN LANGUAGE SKILLS

europass

MOTHER TONGUE(S): **Italian**

ENGLISH EXCELLENT	C1	C1	C1	C1	C1

ACADEMIC STUDIES

PH.D.
2021 - 2024
ONGOING STUDIES

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

Alma Mater Studiorum - Università di Bologna
Chemistry PhD
PhD cycle: 37

Thesis supervisor: Stefano Zacchini

Expected graduation date: 31/10/2024

MASTER'S DEGREE
2019 - 2021
CERTIFIED TITLE

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

Alma Mater Studiorum - Università di Bologna
Scuola di Scienze
CHIMICA INDUSTRIALE

specific field of the degree course: chimica industriale
LM-71 - 2nd level degree in Industrial chemistry and related technologies

Dissertation/thesis title: Sintesi e studio dell'attività catalitica, in reazioni di idrogenazione e trasferimento di idrogeno, di cluster carbonilici idrurici di Rutenio e Iridio | Thesis supervisor: CESARI CRISTIANA

Age at graduation: 24 | Official duration: 2 years
Final degree mark: **110/110**
Graduation date: 19/10/2021

BACHELOR'S DEGREE
2016 - 2019
CERTIFIED TITLE

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

Alma Mater Studiorum - Università di Bologna
Scuola di Scienze
CHIMICA INDUSTRIALE

L-27 - 1st level degree in Chemistry

Dissertation/thesis title: Sintesi e studio della reattività di complessi di ferro N-eterociclici nella reazione di deidrogenazione di ammonia borano mediante spettroscopia IR | Dissertation/thesis subject: Chimica Inorganica | Thesis supervisor: MAZZONI RITA

Age at graduation: 22 | Official duration: 3 years
Final degree mark: **107/110**
Graduation date: 17/10/2019

WORK EXPERIENCES

PhD research topics
UNIVERSITY OF BOLOGNA
Chemistry
BOLOGNA (BO)
10/2021 - 10/2024

Main activities and responsibilities: -Synthesis and characterization of metal carbonyl cluster (homo and heterometallic) of Co, Pd, Fe, Ru, Ir, Os, Rh
-Reactivity and study of magnetic/electrochemical properties of the compounds
-Use of the compounds in homogeneous catalysis
-Use of the compounds as precursors of metal NPs or supported heterogeneous catalysts
Acquired skills and achieved objectives: -Use of controlled atmosphere using the Schlenk technique (CO,N2,H2,Ar)
-Use of high pressure reactor (autoclave)
-Structural and spectroscopical charachterization method (multinuclear NMR, FT-IR, MS, AA, AE, SC-XRD)

PhD Abroad Period
LUND UNIVERSITY
Chemistry
LUND (SWEDEN)
03/2023 - 07/2023

Main activities and responsibilities: The research activity concerned the synthesis and characterization of new carbonyl clusters of transition metals, in particular heterometallic clusters of Osmium-Rhodium and Iridium-Ruthenium; the optimization of the synthesis and the reactivity were studied, in particular in the presence of neutral ligands such as chiaral phosphines. Furthermore, their

activity was evaluated in various homogeneous catalytic reactions, including asymmetric hydrogenations using alpha-unsaturated carboxylic acids as substrates.
Acquired skills and achieved objectives: Reactants and products are highly sensitive to air, therefore the reactions have been carried out in a controlled atmosphere using the Schlenk technique. The products have been characterized through IR spectroscopy, mass spectroscopy, NMR and SC-XRD
Employed as: intern/trainee - fixed-length contract

Masters' Degree Internship
UNIVERSITY OF BOLOGNA, 'TOSO MONTANARI' DEPARTMENT
Chemistry
BOLOGNA (BO)
03/2021 - 09/2021

Main activities and responsibilities: Study and characterization of hydride heterometallic carbonyl clusters containing transition metals in low oxidation states stabilized by ligands, with particular attention to the synthesis and study of the reactivity of ruthenium and iridium carbonyl clusters. These compound have been employed as catalysts precursors in homogeneous reduction of polar and apolar double bonds, both my means of hydrogen trasfer and hydrogenation using molecular hydrogen.
Acquired skills and achieved objectives: Given the compounds sensitivity, schlenk lines and the use of controlled atmosphere (CO,N2,H2,Ar) have been used in all unitary operations. Structural and spectroscopical methods of characterization have been emplyed (multinuclear NMR, FT-IR, MS, AA, AE, SC-XRD).
Employed as: intern/trainee - undergraduate internship

Bachelor Degree Internship
UNIVERSITY OF BOLOGNA, 'TOSO MONTANARI' DEPARTMENT
Chemistry
BOLOGNA (BO)
04/2019 - 10/2019

Main activities and responsibilities: Iron complexes bearing carbene NHC and ciclopentadienone ligands have been synthesized and charactherized. They have then been used as precursors of catalysts in the dehydrogenation reaction of ammonia borane in solution; also it was evaluated and studied the proposed active state of the complex and the progression of the reaction through IR spectroscopy
Acquired skills and achieved objectives: Organic synthetic procedures have been employed for the synthesis of the ligands and for the iron complexes workup. FT-IR and 1H NMR have been used as the main method of analysis and characterization.
Employed as: intern/trainee - undergraduate internship

FOREIGN LANGUAGE SKILLS

English Certificazione lingua inglese, Cambridge English, 2015 , **Europass level B2**

PROFESSIONAL ACCOLADES AND AWARDS

AWARD / SCOLARSHIP
2024

Prize for congress participation
Winner of C3 (Centre for Chemical Catalysis) prize for the partecipation at the event 9th EuChems Dublin 2024

AWARD / SCOLARSHIP
2023

Scholarship for visiting period
Winner of a Scholarship of 4 months from Blanceflor Foundation used to spend the visiting period of the phD in Lund, Sweden

AWARD / SCOLARSHIP
2023

Prize for congress participation
Winner of C3 (Centre for Chemical Catalysis) prize for the partecipation at the event ISOC 2023 - XIV International School of Organometallic Chemistry

AWARD / SCOLARSHIP
2023

Prize for congress participation
Winner of C3 (Centre for Chemical Catalysis) prize for the partecipation at the event MYCS Rimini 2023

AWARD / SCOLARSHIP
2022

Prize for congress participation
Winner of C3 (Centre for Chemical Catalysis) prize for the partecipation at the event MYCS Rimini 2022

CONFERENCES AND SEMINARS

CONFERENCES
01/07/2024

9th EuChems Chemistry Congress , Dublin, Ireland
Poster Contribution and Flash Presentation titled 'Iron and Ruthenium homometallic carbide carbonyl clusters: synthesis, characterization and reactivity'

CONFERENCES
04/06/2024

C3 day , Bologna, Italy
Poster contribution titled 'Transition Metal Carbonyl Cluster as homogeneous catalysts precursors'

CONFERENCES
01/09/2023

MYCS 2023 Rimini Merck Young Chemists' Symposium , Rimini, Italy
Poster contribution and flash presentation titled 'Synthesis and characterization of chiral [(μ-H)3Os3Rh(CO)10(diphosphine)] clusters and study of their catalytic activity in asymmetric hydrogenation'

CONFERENCES
01/09/2023

ISOC Camerino XIV INTERNATIONAL SCHOOL OF ORGANOMETALLIC CHEMISTRY , Camerino, Italy
Poster contribution titled 'Synthesis and characterization of chiral [(μ-H)3Os3Rh(CO)10(diphosphine)] clusters and study of their catalytic activity in asymmetric hydrogenation'

CONFERENCES
01/11/2022

MYCS 2022 Rimini Merck Young Chemists' Symposium , Rimini, Italy
Oral presentation titled 'Synthesis, characterization and catalytic activity of heterometallic Ruthenium carbonyl clusters'

CONFERENCES
01/09/2022

44th International Conference on Coordination Chemistry ICCC 2022 , Rimini, Italy
Poster contribution titled 'Ruthenium-Iridium hydride carbonyl clusters: synthesis, characterization and study of catalytic activity'

CONFERENCES
31/05/2022

C3 Kick off meeting
Oral contribution titled 'Bimetallic Ruthenium Carbonyl Clusters: synthesis, characterization and study of catalytic activity'

PUBLICATIONS

JOURNAL ARTICLES
2024

Cristiana Cesari,Marco Bortoluzzi, Cristina Femoni, Francesca Forti, Maria Carmela Iapalucci and Stefano Zacchini, Peraurated Ruthenium Hydride Carbonyl Clusters: Aurophilicity, Isolobal Analogy, Structural Isomerism, and Fluxionality
Dalton Trans., 2024, 53, 3865
DOI: 10.1039/D3DT04282K

OTHER
2024

Submitted articles
-Submitted to Inorganic Chemistry
HETEROMETALLIC RU-IR HYDRIDE CARBONYL CLUSTERS
Forti; Cesari; Bortoluzzi; Femoni; Iapalucci; Zacchini
-Submitted to Inorganica Chimica Acta
MOLECULAR HYDRIDE CARBONYL CLUSTERS AND NANOCLUSTERS
Cesari; Femoni; Forti; Iapalucci; Scorzoni; Zacchini
-Submitted to European Journal of Inorganic Chemistry
ISOMERISM IN MOLECULAR METAL CARBONYL CLUSTERS
Cesari; Femoni; Forti; Iapalucci; Scorzoni; Zacchini

JOURNAL ARTICLES
2023

Francesca Forti, Cristiana Cesari, Marco Bortoluzzi, Cristina Femoni, Maria Carmela Iapalucci and Stefano Zacchini, Heterometallic Ru-Ir carbonyl clusters as catalyst precursors for hydrogenation and hydrogen transfer reactions
New J. Chem., 2023, 47, 19289
DOI:10.1039/d3nj03478j

JOURNAL ARTICLES
2022

Cristiana Cesari,Marco Bortoluzzi, Francesca Forti, Lisa Gubbels, Cristina Femoni, Maria Carmela Iapalucci, and Stefano Zacchini, 2-D Molecular Alloy Ru-M (M = Cu, Ag, and Au) Carbonyl Clusters: Synthesis, Molecular Structure, Catalysis, and Computational

Studies
Inorg. Chem. 2022, 61, 14726-14741
DOI: 10.1021/acs.inorgchem.2c02099

TEACHING ACTIVITIES

LESSONS/LECTURES
2024

University of Bologna
Co-supervisor
- Co-Supervisor of Bachelor Degree thesis of Andrea Biagetti 'Studio e reattività di cluster carburo carbonilici di Co-Pd'
- Co-Supervisor of Bachelor Degree thesis of Greta Bagagli 'Sintesi, caratterizzazione e reattività di cluster carbonilici di rutenio contenenti zolfo'
- Co-Supervisor of Bachelor Degree thesis of Mathias Vanwinkel 'Synthesis and characterization of Iron carbide carbonyl cluster'

LESSONS/LECTURES
2023

University of Bologna
Tutor
Didactic tutor of the three-year course of Industrial Chemistry 'General and Inorganic Chemistry with Laboratory'
60 hours
Main Professor: Stefano Zacchini, Cristina Femoni

LESSONS/LECTURES
2023

University of Bologna
Co-supervisor
Co-Supervisor of Bachelor Degree thesis of Giuseppe Tartari titled 'Sintesi, caratterizzazione e applicazione in catalisi di cluster metallo carbonilici di Rutenio e Oro', A.A. 2022-2023

LESSONS/LECTURES
2022

University of Bologna
Co-supervisor
Co-supervisor of second Cycle Degree Thesis in Low Carbon Technologies and Sustainable Chemistry of Gian Luco Manfredini titled 'Synthesis and Characterization of Iron Carbide Carbonyl Clusters', A.A. 2021-2022

LESSONS/LECTURES
2022

University of Bologna
Co-supervisor
Co-supervisor of Bachelor Degree Thesis of Lorenzo Baralli titled 'Sintesi di cluster carbonilici di Ru contenenti metalli da conio', A.A. 2021-2022

LESSONS/LECTURES
2022

University of Bologna
Tutor
Didactic tutor of the three-year course of Industrial Chemistry 'General and Inorganic Chemistry with Laboratory'
60 hours
Main Professor: Stefano Zacchini, Cristina Femoni

ADDITIONAL INFORMATION

-Member of C3 Centre of Chemical Catalysis (Bologna)
-Member of the organizing commetee at the 44th International Conference on Coordination Chemistry ICCC 2022
-Member of SCI giovani
-Participation at the C3 Contest
-Participation in the Magistralmente event at the Student Cafè
-Participation in the OrientaME project as Mentor

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'Code regarding the protection of personal data