RESEARCH EXPERIENCE

PhD scholarship | November 2022 – in progress

My project is focused on the mechanistic study of the photocatalytic CO_2 reduction reaction into fuels on graphitic carbon nitride materials (g-C_3N_4). The operando X-ray absorption spectroscopy is used to investigate the surface reactivity of this catalyst involving the in-situ reaction cell use at APE-HE beamline at Elettra synchrotron facility. The experimental set up on beamline was specially upgraded to conduct photocatalysis experiments in operando and at ambient pressure. By acquiring NEXAS spectra at the N K edge and $L_{2,3}$ edge of the dopant transition metals, it will be possible to unravel the electronic structure of g-C_3N_4 and study the mechanism of the photoreduction reaction at the solid/gas interface. Other characterization techniques will be used to gain greater insight into the chemical and physical properties of this material.

Department of Chemistry | Università degli Studi di Pavia
Via Taramelli 12, 27100 Pavia
In cooperation with **Elettra-Sincrotrone |APE-HE Beamline**
Strada Statale 14, km 163,5 in AREA Science Park, 34149 Basovizza, Trieste, (IT)

Research Fellowship | December 2021 – October 2022

My activity is focused on the study of heterogeneous catalysis. The operando X-ray absorption spectroscopy is used to investigate the surface reactivity of catalysts involving the in-situ reaction cell use at APE-HE beamline at Elettra synchrotron facility. Among the various materials investigated, my work is particularly focused on soft-XAS investigation of graphitic carbon nitrides g-C_3N_4 as photocatalysts for sustainable CO_2 reduction into fuels.

https://www.trieste.nffa.eu/people/nffa-people/sara-stolfi/
Istituto Officina dei Materiali (IOM) - CNR
Strada Statale 14, km 163,5, 34149 Basovizza TS (IT)
Elettra-Sincrotrone |APE-HE Beamline
Strada Statale 14, km 163,5 in AREA Science Park, 34149 Basovizza, Trieste, (IT)

Training Experience | February 2022

Beam time experience at ESRF. My work was based on obtaining electronic and structural insights of MIL-100(Fe) by using a combined in situ XAS/XES study targeting Fe(II) sites. By thermal activation, Fe^{3+} sites are created through the elimination of water, and then Fe^{2+} sites through the elimination of a monovalent anion. These iron sites are active towards Methane to Methanol reaction (MTM) in presence of N_2O as the oxo-transfer agent. The synchrotron source at ESRF in combination with parallel soft-XAS studies was very useful to reach important spectroscopic details of this catalyst material.

European Synchrotron Radiation Facility|ID26 Beamline
71, avenue des Martyrs, 38043 Grenoble, France

Research Internship | July 2020 – May 2021

Master thesis internship focused on the hydrothermal synthesis of metal tungstates for the photocatalytic nitrogen fixation. The aim of the research was to demonstrate their character as catalysts under entirely sustainable conditions. They use solar photons as energy sources and water as reducing reagent. The work involved the use and experience of some important characterization techniques: X-ray diffraction (XRD), Raman spectroscopy, plasma atomic emission spectroscopy (ICP-AES), physisorption, scanning electron microscopy (SEM) and diffuse reflectance UV-Vis spectroscopy.

In cooperation with **Materials, Environment and Energy Research Group – MEE|Department of Chemical and Pharmaceutical Sciences**
http://meeresearch.weebly.com/team.html
Università degli studi di Trieste
Via Licio Giorgieri, 1, Trieste

Research Internship | October 2017 – January 2018

Research internship about laser deposition and characterization of hydroxyapatite thin films on silicon and titanium substrates for the coating of bone protheses.
In this thesis work, the films were deposited using nanosecond pulses and then characterized using various investigative techniques: atomic force microscopy (AFM), scanning electron microscopy coupled with X-ray dispersive spectroscopy (SEM-EDS), X-ray photoelectron spectroscopy (XPS), Raman spectroscopy and X-ray diffraction (XRD).

Laser Physical Chemistry Laboratory, Department of Science
Università degli studi della Basilicata
Via dell'Ateneo Lucano, 10, Potenza

EDUCATION

21/05/2021
A.A. 2019/2020:
Master of Science – MSc|Chemistry, Supramolecular and Nanostructured Systems – 110/110 Cum Laude
Università degli Studi di Trieste
Via Licio Giorgieri, 1, 34127 Trieste (TS)

20/03/2018
A.A. 2016/2017:
Bachelor of Science – BSc|Chemistry – 104/110
Università degli Studi della Basilicata
Via dell'Ateneo Lucano, 10, 85100 Potenza (PZ)

2013/2014:
High School Diploma, Classical studies
Via Vaccaro 36B, Potenza (PZ)

STOLFI SARA

CONTACT

+39 342 1251864

stolfi@iom.cnr.it
sarastolfi.94@gmail.com
sara.stolfi01@universitadipavia.it

Via Fabio Severo 73
34126, Trieste (IT)

Language skills

- English language
  B1 CEFR level
  22/07/2015
- French language
  CECR level A2
  11/04/2008

Software

Microsoft Office Package

Matlab Mathworks

OriginPro