

CURRICULUM VITAE

Martina Damizia

EDUCATION

- Oct/2018 Master degree in Chemical Engineering (104/110), Sapienza University of Rome, thesis title (translated from Italian) “Hydrothermal liquefaction of lignocellulosic biomass”, advisor Prof. B. de Caprariis.
- Dec/2014 Bachelor degree in Chemical Engineering (90/110), Sapienza University of Rome, thesis title (translated from Italian) “Design of pressure vessels”, advisor Prof. M. Cavallini.

CURRENT POSITION

- Nov/2019-present PhD student in Chemical Processes for Industry and Environment at Sapienza University of Rome, tutor Prof. P. De Filippis, granted by MUR.

PREVIOUS POSITION

- Nov/2018-Oct/2019 Scholarship at the Department of Mechanical and Aerospace Engineering at Sapienza University of Rome on “Steam reforming of bio-ethanol to produce hydrogen”.

TEACHING ACTIVITIES

- Sept/2022 Tutor of the course “Green Chemistry & Process Engineering” (6 c.f.u.), Chemical Engineering (M.Sc.)
- June/2022 Seminar for M.Sc. in Chemical Engineering entitled “Chemical looping processes for pure hydrogen production”
- April/2020 Seminar for B.Sc. in Chemical engineering during the course of Industrial Chemical Processes entitled “Green hydrogen production”.

FUNDINGS

- 2021 Sapienza fundings for PhD students “Avvio alla Ricerca” (1200 euro).

RESEARCH ACTIVITIES

Hydrothermal liquefaction

I studied and optimized the operative parameters of the hydrothermal liquefaction (HTL) of biomass. I studied and optimized the use of Zero Valent Metals for the partial up-grading of the produced bio-crude. Fe and Zn were used as heterogeneous H_2 producer, exploiting the tendency of Fe and Zn to be oxidized by water to produce hydrogen. Bio-crude with significantly improved yield and quality was obtained. Co and Ni were studied as hydrogenation catalyst and their activity in presence of heterogeneous H_2 produced was investigated. High synergic effect between hydrogenation catalyst and heterogeneous H_2 producers was demonstrated. I am currently developing Ni-supported catalyst for up-grading of bio-crude in hydrothermal conditions.

Production of green hydrogen

Development of a chemical looping process to produce pure H_2 from bioethanol. Development of materials resistant to thermal and chemical deactivation. Optimization of the process for high number of cycles. Collaboration with Sevilla

University for the development of Fe foam to increase process efficiency and to make possible the process scale-up.

Chemical recycling of plastic

Development of a HTL process for the chemical recycling of plastics, in particular polystyrene, nylon and EVA, in this context optimization of the operative parameters and study of the obtained products was made. I demonstrated that hydrothermal liquefaction under mild condition ($T = 300\text{ }^{\circ}\text{C}$) can be an effective technology for the chemical recycling of some plastic materials producing the monomers and also valuable chemicals (aromatics from polystyrene).

PhD SPECIALIZATION SCHOOLS

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| 2022 | “Fundamentals of Electrochemical Processes and their Applications. Heterogeneous Catalysis” Organized by GRICU (GRuppo dell’Ingegneria Chimica dell’Università), 3-9 July 2022, Ischia, Italy. |
| 2021 | “Digitalization Tools for the Chemical and Process Industries” Organized by GRICU. |
| 2021 | “Short Cycle Training on Thermal Analysis” Organized by The University of Cyprus, 4-8 October 2021, Nicosia, Cyprus. |

SCIENTIFIC PRODUCTION

Scopus 10 documents, 89 citations, h-index 4 (Date: August 05, 2022)

PRESENTATIONS AT INTERNATIONAL CONFERENCES

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| June/2022 | “Utilization of Al_2O_3 and MgO as structural promoters of Fe into 2 and 3 steps chemical looping process: pure and green H_2 production”, WHEC2022, 23rd World Hydrogen Energy Conference 26-30/06 2022 Istanbul, Turkey. |
| June/2022 | “Hydrothermal liquefaction of biomass using waste material as catalyst: effect on the bio-crude yield and quality”, IconBM2022, International Conference on Biomass, 5-8 June 2022, in Naples, Italy. |
| May/2021 | "High Thermal stability Fe_2O_3 - Al_2O_3 system to produce renewable pure H_2 in steam iron process" ICHEAP15, 15th International Conference on CHEMICAL AND PROCESS ENGINEERING, 23-26 May, Naples, Italy. |

PARTICIPATION TO PhD COMPETITIONS

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| July/2021 | Partecipation to “Catalisi in Gioco 2021” organized by the italian interdisciplinary group of catalysis, CIG 2021, 27-30 July 2021, in Reggio Calabria, Italy. Position: Finalist. |
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PUBBLICATIONS

Hamidi, R., Tai, L., Paglia, L., Scarsella, M., Damizia, M., De Filippis, P., Musivand, S., de Caprariis, B. Hydrotreating of oak wood bio-crude using heterogeneous hydrogen producer over Y zeolite catalyst synthesized from rice husk (2022) Energy Conversion and Management, 255.

Tai, L., Musivand, S., de Caprariis, B., Damizia, M., Hamidi, R., Ma, W., De Filippis, P.
Co-treatment of plastics with subcritical water for valuable chemical and clean solid fuel production (2022)
Journal of Cleaner Production, 337.

de Caprariis, B., Damizia, M., Tai, L., De Filippis, P.
Hydrothermal Liquefaction of Biomass using Waste Material as Catalyst: Effect on the Bio-crude Yield and Quality (2022) Chemical Engineering Transactions, 92, pp.607-612.

Tai, L., Hamidi, R., de Caprariis, B., Damizia, M., Paglia, L., Scarsella, M., Karimzadeh, R., De Filippis, P.
Guaiacol hydrotreating with in-situ generated hydrogen over ni/modified zeolite supports (2022) Renewable Energy, 182, pp. 647-658.

de Caprariis, B., Damizia, M., De Filippis, P., Bracciale, M.P.
The role of Al₂O₃, MgO and CeO₂ addition on steam iron process stability to produce pure and renewable hydrogen (2021) International Journal of Hydrogen Energy, 46 (79), pp. 39067-39078.

De Filippis, P., D'Alvia, L., Damizia, M., de Caprariis, B., Del Prete, Z.
Pure hydrogen production by steam-iron process: The synergic effect of MnO₂ and Fe₂O₃(2021)
International Journal of Energy Research, 45 (3), pp. 4479-4494.

Damizia, M., Bracciale, M.P., De Caprariis, B., Genova, V., De Filippis, P.
High thermal stability fe system to produce renewable pure hydrogen in steam iron process(2021) Chemical Engineering Transactions, 86, pp. 547-552.

Scarsella, M., de Caprariis, B., Damizia, M., De Filippis, P.
Heterogeneous catalysts for hydrothermal liquefaction of lignocellulosic biomass: A review(2020) Biomass and Bioenergy, 140.

de Caprariis, B., Bracciale, M.P., Bavasso, I., Chen, G., Damizia, M., Genova, V., Marra, F., Paglia, L., Pulci, G., Scarsella, M., Tai, L., De Filippis, P.
Unsupported Ni metal catalyst in hydrothermal liquefaction of oak wood: Effect of catalyst surface modification (2020) Science of the Total Environment, 709.

de Caprariis, B., Bavasso, I., Bracciale, M.P., Damizia, M., De Filippis, P., Scarsella, M.
Enhanced bio-crude yield and quality by reductive hydrothermal liquefaction of oak wood biomass: Effect of iron addition (2019) Journal of Analytical and Applied Pyrolysis, 139, pp. 123-130.

Rome, August 5, 2022