Aline Villarreal

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Research Interests
- Porous materials
- Gas capture
- Heterogeneous Catalysis
- Operando spectroscopy

Education

Postdoctoral Researcher (February 2018 - *Current position*)
INTEC**,** Institute of Technologic Development for the Chemical Industry, UNL-CONICET, Santa Fe, Argentina.
Topic: Oxidation of VOCs using Au catalysts followed by operando DRIFT.
Supervisor: Prof. Sebastián Collins

Ph.D., Chemical Engineering (2017) *Suma cum laude*
School of Chemistry, UNAM.
Topic: Capture of CO_2 and H_2S on mordenite, study of the adsorption capacity and selectivity of zeolites to apply in biogas production.
Supervisor: Prof. Jorge Ramírez.

M. Eng. Chemical Engineering (2013), School of Chemistry, UNAM.
Topic: Study of the role of citric acid in the catalytic activity of hydrodesulfurization catalyst.
Supervisor: Prof. Jorge Ramírez. Average: 9.55/10.

Specialization on Applied Petrochemistry, National University of St. Martin, Argentina
Passed qualifying exams.

B.S., Chemical Engineering (2011), School of Chemistry, UNAM.

Graduated with honors, Average: 9.31 (out of 10).

Refereed Publications

2017 — Alumina as catalysts support: a study of the effect of small amounts of silica on MoO_3/Al_2O_3 in ethanol oxidative dehydrogenation. **Aline Villarreal, Gabriella Garbarino, Paola Riani, Aida Gutiérrez-Alejandre, Jorge Ramírez, Guido Busca.** Journal of material and design. *Submitted*.

2017 — Adsorption and separation of CO_2 from N_2 -rich gas on zeolites: Na-X faujasite vs Na-mordenite. **A. Villarreal, G. Garbarino, P. Riani, E. Finocchio, B. Bosio, J. Ramírez, G. Busca.** Journal of CO_2 utilization. 19 (2017) 266-275.

2017 — Analysis of the interaction of CO_2 with Na, K, and Ca-exchanged Mordenite. An infrared spectroscopic study. **A. Villarreal, P. Castillo-Villalón, J. Ramírez.** Journal of the Mexican Chemical Society. 61 (2017) 102-108.

2016 — Catalizadores de hidrodesulfuración NiMo/SiO2/Al2O3. Estudio por FTIR de la interacción ácido cítrico-soporte, **A. Villarreal, A. Gutiérrez-Alejandre, J. Ramírez**, Superficies y vacío, 1 (2016) 14-18.

2014 — Importance of the sulfidation step in the preparation of highly active NiMo/SiO_2/Al_2O_3 hydrodesulfurization catalysts, **A. Villarreal, J. Ramírez, L. Cedeño Caero, P. Castillo Villalón, A. Gutiérrez-Alejandre**, Catalysis Today, 2015 (250) 60-65. DOI: 10.1016/j.cattod.2014.03.035

Research experience

2010-2017

National Autonomous University of Mexico (Catalysis Research Unit)

Principal Researcher: Prof. Jorge Ramírez Solis

- Catalysts preparation through dry impregnation and grafting.
- Use of high pressure batch reactors and GC-MS chromatographs to obtain catalytic activity and kinetics.
- Characterization of porous materials by N_2 physisorption
- Characterization of catalyst using temperature programmed techniques (TPR, TPS and TPD), DRX and UV-Vis spectroscopy.
- Use of high vacuum equipment coupled with FTIR to characterize catalysts and zeolites.
- Use of probe molecules (CO, pyridine) to characterize catalysts and other materials.

2016

Center of Research and advanced studies – Mérida (CINVESTAV)

Principal Researcher: Prof. Patricia Quintana Owen

- Characterization of catalysts using XPS and Raman spectroscopies.

2015

Università degli Studi di Genova (Laboratory of catalysis and surface chemistry)

Principal Researcher: Prof. Guido Busca

- Catalysts preparation through wet impregnation.
- Use of high continuous reactors in line with GC-MS chromatographs to obtain catalytic activity.

Teaching experience

2012 - 2014 & 2016-present

Teacher, *Experimental Chemical Engineering*, undergraduate courses
School of Chemistry, UNAM.

- Several laboratory courses covering mass and energy balances, transport phenomena, heat transfer engineering and chemical reactors.
- Successfully develop new strategies to evaluate the students such as: posters sessions and the development of new projects.

2011-2012

Teaching assistant, *Thermodynamics***,** undergraduate course**.**
School of Chemistry, UNAM.

- Help explaining theory problems to undergraduate students
- Assistance in laboratory sessions
- Development of new experimentation protocols

Languages

- English: Fluent oral and writing
- German: B1 Level (Zertifikat Deutsch)

References

1. Prof. Jorge Ramírez Solís.
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   National Autonomous University of Mexico,
   México, D.F.
   jrs@unam.mx, jrsorama@gmail.com
   Phone: +52 55 56225349

2. Prof. Guido Busca
   Laboratorio di Chimica delle Superfici e Catalisi Industriale
   Dipartimento di Ingegneria Civile, Chimica e Ambientale
   Università di Genova, Genova (Italy)
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3. Prof. Aída Gutiérrez-Alejandre
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