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Three doctoral students working in catalysis and separation, three prizes awarded by three different associations active in the field. A look at the three theses that have been singled out for praise.



**Elsy El Hayek**, from 2017 to 2020 a doctoral student at IFPEN, was awarded the 2022

Denise Barthomeuf Thesis Prize for her work on « [“New acid zeolites obtained from silicogermanates](#) » during the annual meeting of the [French Zeolite Group](#) (29 to 31 March 2022). Each year, this prize is awarded for thesis work involving zeolite-type porous materials.

**Her work in a few words**

The **introduction of germanium during zeolite synthesis** gives rise to **large pores**, thus **improving the catalytic transformation of bulky molecules**; but there are also challenges, such as the **instability of silicogermanates**. Current approaches to counter these problems have limited effectiveness. This thesis proposes an original way **to stabilize silicogermanates**, drawing on both theoretical calculations (DFT - density functional theory) and experimental work (synthesis, characterization, catalytic tests). The synthesized materials were tested as an acid phase for **bi-functional hydroisomerization of n-decane and n-hexadecane**. Their **ability to accelerate chemical reactions** is promising, thus opening perspectives for their use in the **catalysis of stable silicogermanate derivatives**.

**Scientific advisors** : [Bogdan Harbuzaru](#), [Céline Chizallet](#)



On 17 January 2022, the Coordination Chemistry division of the Société Chimique de

France (French Chemistry Society) awarded the [2021 Thesis Prize](#), jointly with Nikos Kostopoulos (Université de Paris), to **Julien Petit**, a doctoral student with IFPEN from 2018 to 2021, for his work on “Exploration of a new reactivity in ethylene oligomerization: towards new dicationic nickel complexes”.

### **His work in a few words**

The **alpha-olefins** obtained through **ethylene oligomerization** are petrochemical intermediates used in the production of many daily products, including, in particular, polyethylene. This very fundamental thesis has led to the development of new methods for synthesizing **dicationic Ni complexes**, seldom described until now, and further explored their reactivity in ethylene oligomerization, with significant methodological advances in terms of demonstrating the **implied reactional mechanism**.

**Scientific advisors** : [Lionel Magna](#), [Pierre-Alain Breuil](#)



During the 11th Conference of the Association Française de l'Adsorption (French

Adsorption Association) (27 and 28 January 2022), **Wassim Ammar**, a doctoral student at IFPEN since 2019, was awarded the prize for best oral presentation about the separation of second-generation sugars using zeolites.

### **His work in a few words**

Wassim Ammar's thesis concerns “**The study of the adsorption of sugars by separation agents: understanding the mechanisms involved**”. It specifies the mechanisms by which the properties of

the zeolite (chemical composition and structure) improve **the adsorption selectivity of C5/C6 sugars**. It is crucial to determine **the enthalpic and entropic contributions of adsorption**, induced by **confinement in the zeolitic structure**, in order to answer these questions and, ultimately, propose innovative solutions for the problem of the separation of these sugars.

**Scientific advisors** : [Alain Méthivier](#), [Maria Manko](#), [Kim Larmier](#)

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