

# Bringing Nobel Prize-winning technology to the chemical industry





**European Union** European Regional **Development Fund** 













Development of formulations and optimization of polymerization process and other industrial process development

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# Our focus: Olefin Metathesis



Cross Metathesis (CM)

Ring Closing Metathesis (RCM)

Ring Opening Metathesis (ROM)

Ring Opening Metathesis Polymerization (ROMP)

Acyclic Diene Metathesis polymerization (ADMET)

### Application



# Why we do what we do?



### We help our partners make a difference in the world.

#### **Healthcare**

benign and cheaper methods for the production of new generation drugs







#### **Decreased fossil fuel reliance**

high value chemicals derived from renewable feedstocks





### **Reduced CO<sub>2</sub> footprint**

application of novel light-weight advanced materials in the automotive industry





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### Product and IP





Proprietary catalysts covering major European, North American and Asian markets

## Vision & People



**Our passion:** Providing clients with an enabling technology that will allow development of novel processes and products, thus opening new market opportunities and generating positive impact

**Our niche:** Olefin metathesis for industrial applications



# Use case – Apeiron's catalyst vs. competitor's eading the way in metathesis

#### Synthesis of Hepatitis C Antiviral Agent BILN 2061



#### Apeiron's Technology at Work

- 18x reduced manufacturing cost
- 16x shorter reaction time
- 7x lower production waste





# UltraCat and UltraNitroCat Scale Up

#### POIR.01.01.01-00-0795/17-02



Gawin R., Kozakiewicz A., Guńka P.A., Dąbrowski P., Skowerski K. Angew Chem Int Ed Engl. 2017;56, 981











# UltraCat and UltraNitroCat Scale Up

`CN

#### POIR.01.01.01-00-0795/17-02

Ph

R

Cl◀



9-DAME







CatalystGC yield [%]Selectivity<br/>[%]TON<br/>[%]UltraNitroCat757538.000nitro-Grela348118.400 $\int_{8}^{0}$  $\int_{3}^{0}$  $\int_{10}^{0}$  $\int_{10}^{0}$  $\int_{10}^{0}$  $\int_{10}^{0}$  $\int_{10}^{0}$  $\int_{10}^{0}$ 

Catalyst	GC yield [%]	TON
UltraNitroCat	90	30.000
nitro-Grela	7	2.300
Grubbs II	12	4.000



**UltraNitroCat** 

 $NO_2$ 



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# UltraCat and UltraNitroCat Scale Up

#### POIR.01.01.01-00-0795/17-02





# High Value Chemicals from Natural Oils

<sup>CO<sub>2</sub>Me</sup>	Catalyst	$MeO_2C$
/	neat	1 1

methyl 9-decenoate

dimethyl 9-octadecenedioate

UltraCat cost per 1 kg of product 0.85 Euro

	Catalyst	Concentration	Catalyst loading [ppm]	Yield [%]	TON*
Elevance	C-827	neat	17.8 (80 ppm wt)	19	5 327
Apeiron	UltraCat	neat	2 (11 ppm wt)	71	177 250

\*Catalyst Turn-over Number calculated for productive dimethyl 9-octadecenedioate formation.



UltraCat cost per 1 kg of product 0.65 Euro

	Catalyst	Additive	Concentration	Catalyst loading [ppm]	Yield [%]	TON*	<b>Reaction time</b>
Nalco Sciences	G-II (C-848)	2-chloro-1,4- benzoquinone	neat	2.4 – added in 6 portions	60	125 595	6h
Apeiron	UltraCat	-	neat	1 – added in 1 portion	63	315 850	1h

\*Catalyst Turn-over Number calculated for productive dimer formation.

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- 1. Elevance Renewable Sciences INC US 2013/0204022A1
- 2. http://www.materia-inc.com/products/catalysts/library
- 3. Apeiron Synthesis PCT/IB2016/054486
- 4. Nalco Sciences US9150468



### – projects underway (polymers) –

advanced material for Mercedes AMG



#### specialty materials for 3D printing





## Lab & Equipment



Apeiron operates from a **400 m<sup>2</sup> laboratory** at Wrocław Technology Park.

The company uses state-of-the-art lab equipment









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