

MONOLITHOS

**COMPANY
PROFILE**



MONOLITHOS

MONOLITHOS AT A GLANCE

LOCATIONS: HEAD OFFICE: Vrilissou 83, 11476 Athens
PRODUCTION: Anonymou 5 and Anonymou 7, 10442 Athens
DISTRIBUTION CENTER NORTH GREECE: Thessaloniki

LICENSING: PRODUCTION OF EMISSION CONTROL DEVICES (CATS, DPFS)
COLLECTION, TRANSFER, TEMPORARY STORAGE
PRE-PROCESSING AND ASSAYING OF SPENT CATALYSTS

CLIENT PORTFOLIO

1025 Greek Professional Automotive Workshops
Clients for aftermarket products

1335 Greek Suppliers of spent automotive catalysts for recycling

ECONOMICAL FIGURES

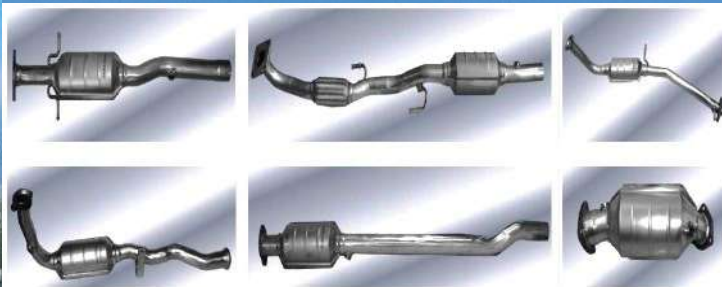
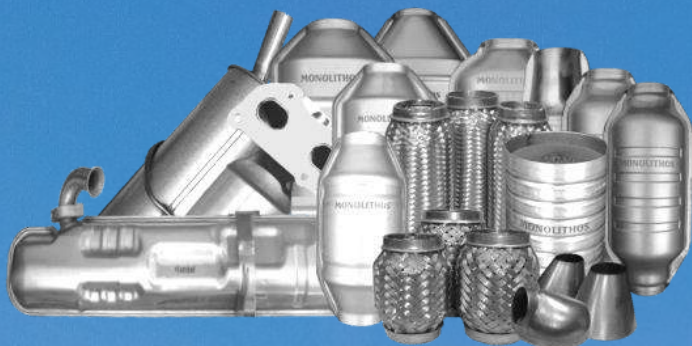
All domestic and foreign suppliers are being paid in advance (*zero open accounts to suppliers*)

Zero Bank Loans

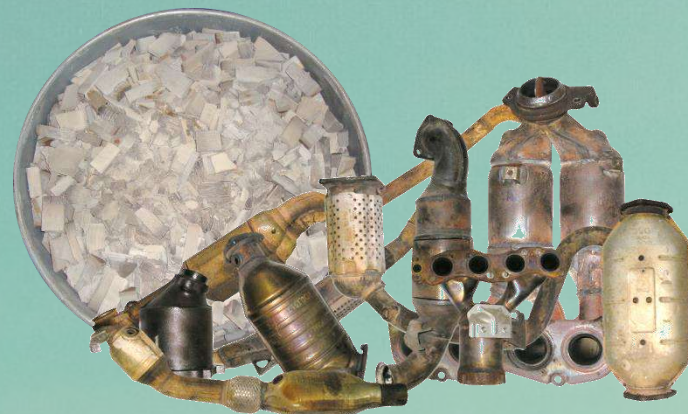
Exports to Europe: 35.7 % of Total Revenue

COMMERCIAL ACTIVITIES

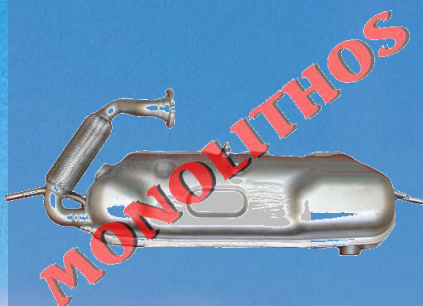
MONOLITHOS



**Automotive
Catalytic Converters
& Diesel
Particulate Filters (DPFs)
Manufacturing**



**Recycling &
Assaying of
Platinum
Group Metals**



**Diesel Particulate Filters
(DPFs)
& Selective Catalytic
Reduction Systems
(SCRs)
Regeneration**

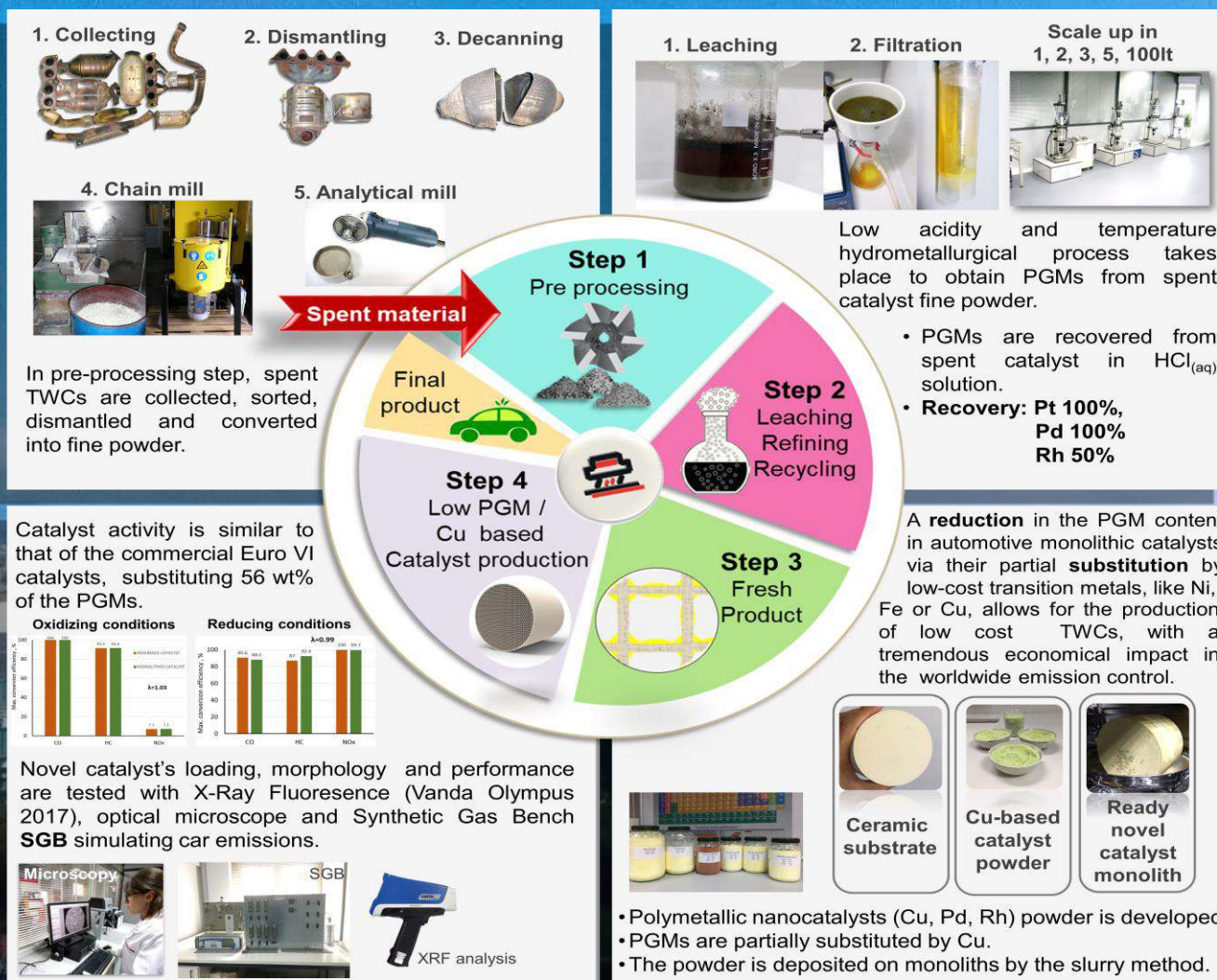


**Marine &
Stationary
Catalytic
Applications**



**Heavy
Duty
Applications**

MONOLITHOS circular economy scheme aims in using only recycled critical raw materials (namely PGMs, rare earths as well as cobalt, tungsten and vanadium) for the total new catalysts production by implementing low critical raw materials nanocatalysts and cost-effective recycling technologies.





Management

- **Iakovos Yakoumis**, Chemical Engineer (MSc), CEO and Founder
- **Ekaterini Polyzou**, Chemical Engineer (MSc), COO and Founder
- **Anthi-Maria Sofianou, Economist**, CPO and Founder
- **Anastasia-Maria Moschovi**, Material Scientist (Phd), CTO
- **Konstantinos Sakkas**, Metallurgical Engineer (Phd), Head of Business Development



Researchers

- **Panagiota-Argyro Doika**, Chemical Engineer (MSc), Catalyst Efficiency and Jr. Project Manager
- **Marianna Panou**, Material Scientist (MSc), PGM recycling and Laboratory Supervisor
- **Ioannis Stamatopoulos**, Chemist (Phd), Catalyst Synthesis
- **Ioanna-Ydili Betsi-Argyropoulou**, Environmental Engineer (MSc), Membrane and Diesel Applications
- **Papagianni Sotiria**, Metallurgical Engineer (MSc), PGM recycling
- **Spathariotis Stylianos**, Metallurgical Engineer (PhD), Jr. Business Developer (starting 1/3/2020)



TOXIC EMISSION CONTROL FOR THE AUTOMOTIVE SECTOR



Key target of the PROMETHEUS project is to demonstrate in large scale the substitution up to 67% of the PGMs used in automotive catalysts.

EURO6CAT

The EURO6CAT project will introduce a disruptive innovation in automotive emission control, by designing, optimizing and testing under real conditions hybrid catalytic after-treatment systems substituting cast iron alloys and expensive and critical Platinum Group Metals, by lighter and of improved thermal resistance cast alloys and copper nano-particles based catalysts.

TOXIC EMISSION CONTROL FOR HEAVY DUTY APPLICATIONS



LIFE17 ENV/GR/000352



The project will implement the use of innovative Catalyst Based Emission Control System on heavy duty vehicles.

The project aims to stimulate the emergence of territorial ecosystems for PGMs recycling and substitution in automotive catalysts, based on a new technology that substitutes PGMs with copper nanoparticles.

INDUSTRIAL CATALYSTS

SAFE - VULCA

An upscaling project SAFE-VULCA aimed at Safer reduction of ZnO amount in rubber vulcanization process run together with Pirelli Tyre S.p.A.



RECYCLING OF CATALYSTS



SC5-13 call of Horizon 2020

HORIZON2020: Platinum group metals recovery Using Secondary raw materials.



Horizon 2020

HORIZON2020: First of a kind commercial Compact system for the efficient Recovery Of Cobalt. Designed with novel Integrated LEading technologies

CO₂ EMISSION CONTROL



Carbon Dioxide Absorbing Materials Project RISE



H2020-MSCA-RISE-2016 / call of Horizon 2020.

The objective is to find an inexpensive, effective and robust solution for significant CO₂ reduction from industries and civil transport.

TRAINING IN THE FIELD OF CRMs AND CIRCULAR ECONOMY



Bringing Research Knowledge to Exploitation: A T-Shape Itinerary Approach
EIT RAW MATERIALS
KAVA CALL 4

The project BREAKit proposes a training path to help researchers and other technical professionals in the transition from a technical and specialised profile to a T-shaped profile.



BRIEFCASE

Learning the Uses of Minerals Through Non-Conventional Teaching Tools

PROJECT AGREEMENT NO <18115>

MONOLITHOS
Catalysts, DPF
& Recycling



COST NETWORKING ACTIONS (H2020) **MONOLITHOS**



SOLUTIONS FOR
CRITICAL RAW
MATERIALS UNDER
EXTREME CONDITIONS
(CRM-EXTREME)

***The Network is being
funded under EU
COST Action A15102.***

<http://www.crm-extreme.eu/>



INTERDISCIPLINARITY
IN RESEARCH
PROGRAMMING AND
FUNDING CYCLES
(INTREPID)

***The Network is being
funded under the EU
COST Action Initiative
TD 1408.***

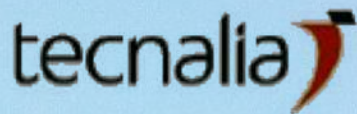
<http://www.intrepid-cost.eu/>



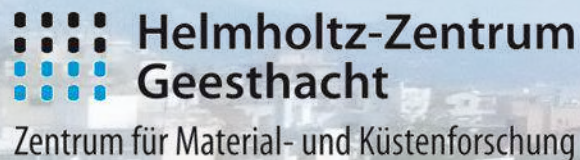
NETWORK ON
TECHNOLOGY-CRITICAL
ELEMENTS - FROM
ENVIRONMENTAL
PROCESSES TO HUMAN
HEALTH THREATS

***The Network is being
funded under the EU
COST Action Initiative
TD 1407.***

<http://www.costnotice.net/>



CENTRO
RICERCHE
FIAT



UNIVERSITÀ
POLITECNICA
DELLE MARCHE



Env-Aqua Solutions



PATENTS

- Copper based catalysts for engine exhaust gas stream treatment (EP19386014).
- Method, device and process for the treatment of engine flue gases with high oxygen excess (EP19386007).
- Method, device and process for the abatement of SO₂ emissions in internal combustion engines (pending).



PUBLICATIONS

- A. Gutierrez et al., 2019, The Journal of Physical Chemistry "Insights on Carbon Nanotubes and Fullerenes in Molten Alkali Carbonates", DOI: [10.1021/acs.jpcc.9b00855](https://doi.org/10.1021/acs.jpcc.9b00855)
- A. Gutiérrez et al., 2018, Langmuir "Theoretical Study on Molten Alkali Carbonate Interfaces" DOI: [10.1021/acs.langmuir.8b02907](https://doi.org/10.1021/acs.langmuir.8b02907)
- I. Yakoumis et al., 2018, "Real life experimental determination of platinum group metals content in automotive catalytic converters", IOP Conference Series: Material Science and Engineering, DOI: [10.1088/1757-899X/329/1/012009](https://doi.org/10.1088/1757-899X/329/1/012009)
- A. Moschovi et al., 2018, "An Integrated Circular Economy Model for Decoupling Europe From Platinum Group Metals Supply Risk in the Automotive Sector", IEEE International Conference on Environment and Electrical Engineering, DOI: [10.1109/EEEIC.2018.8493824](https://doi.org/10.1109/EEEIC.2018.8493824)
- I. Yakoumis et al., 2016, Journal of Membrane Science, "Tubular C/Cu decorated γ -alumina membranes for NO abatement", DOI: [10.1016/j.memsci.2016.05.047](https://doi.org/10.1016/j.memsci.2016.05.047)
- G. Kolliopoulos et al., 2014, OALib Journal "Behaviour of platinum group metals during their pyrometallurgical recovery from spent automotive catalysts", DOI: [10.4236](https://doi.org/10.4236)



KEY-NOTE CONFERENCE PRESENTATION

- 2nd International Conference and Expo on Separation Techniques (26-28/9/2016, Valencia, Spain), "Towards Hollow Fibers Automotive Catalytic Converters: Effect of Carbon on the NO Abatement efficiency of Cu decorated C/Al₂O₃ Porous Hollow Fibers".
- Conference "International Days in Critical Raw Materials", Burgos (Spain, 25-26/6/2015), "Catalytic mono-channeled monoliths to substitute PGMs by Cu nanoparticles for Automotive Applications".



INVITED LECTURES

- 2018, 18th International Conference on Environment and Electrical Engineering, Palermo, Italy "An integrated circular economy model for decoupling Europe from Platinum Group Metals supply risk in the automotive sector".
- Lisbon Training Scholl (6-7/2/2017), "Financing innovative SMEs in the area of critical raw materials".
- 2016 EMRS (European Materials Research Society) Spring Meeting, "Substitution and Recycling of Critical Raw Materials from Catalytic Emission Control Devices in the Automotive Sector".
- 21st International Workshop of TACEC Programme, 2014, "How to treat catalyst to recover precious metals and rare earths".
- University of Padova, 2014, "Critical Materials and Automotive Catalytic Converters: From substitution to recycling".

