



MONOLITHOS

**COMPANY
PROFILE**

Athens, November 2017

MONOLITHOS

MONOLITHOS AT A GLANCE

LOCATIONS: HEAD OFFICE: Vrilissou 83, 11476 Athens
PRODUCTION: Anonymou 5, 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

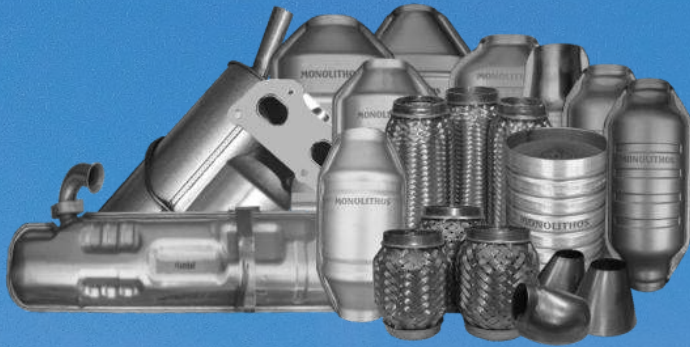
All domestic and foreign suppliers are being paid in advance (*zero open accounts to suppliers*)

Zero Bank Loans

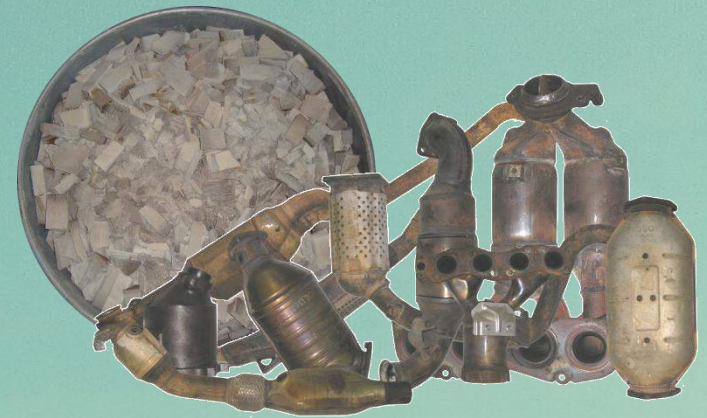
Exports to Europe: 35.7 % of Total Revenue

COMMERCIAL ACTIVITIES

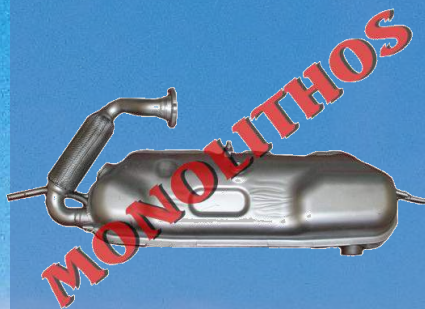
MONOLITHOS



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



**Recycling &
Assaying of
Platinum
Group Metals**



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

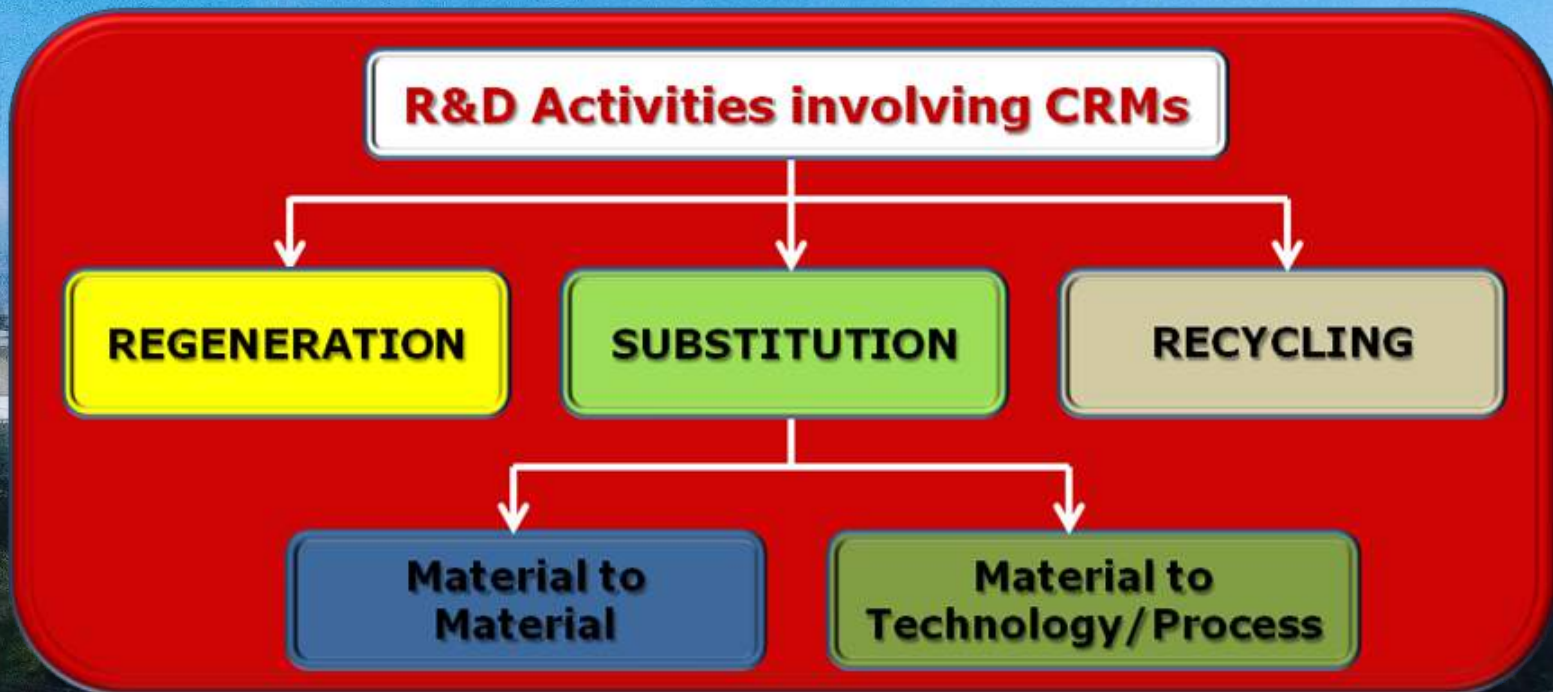


**Marine &
Stationary
Catalytic
Applications**



**Heavy
Duty
Applications**

MONOLITHOS[®] products incorporate two families of critical raw materials (CRMs), namely noble metals (*Platinum, Palladium, Rhodium, Gold, etc.*) and rare earths (*Lanthanum, Cerium, etc.*)

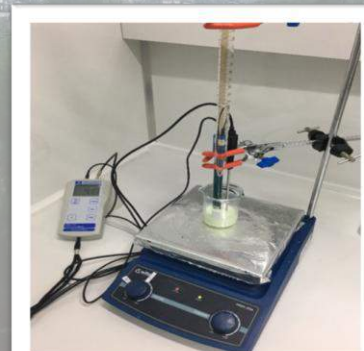


LABORATORY CAPABILITIES

MONOLITHOS



- **Milling facility** (3 ball mills: 250kg/h, 25kg/h, analytical mill)
- **4 leaching reactors** (1lt, 2lt, 3lt, 5lt working up to 250°C and under vacuum) for recovery of precious metals, rare earths and critical raw materials and elements from catalysts (Co, W, V)
- **Development of Polymetallic** (Cu, Pt, Pd, Rh) nano-catalytic washcoats in pilot scale (1-100kg)
- **Coating** (with wet impregnation) of nano-catalytic washcoats on ceramic honeycombs
- **Synthetic Gas Bench** for catalyst efficiency screening and ageing
- **X-Ray Fluorescence (XRF)** calibrated for auto-catalysts assaying (content determination of noble metals)





PLATIRUS:
PLATINUM
GROUP METALS
RECOVERY
USING
SECONDARY
RAW MATERIALS

The project is being funded under SC5-13 call of Horizon 2020.

<http://www.platirus.eu/>

PROMETHEUS

PROMETHEUS:
PLATINUM
GROUP METALS
SAVING BY
MONOLITHOS
EFFICIENT &
DISRUPTIVE
CATALYST
INNOVATION

The project is being funded under SME Instrument (Phase II) call of Horizon 2020.

CO2MPRISE

CO2MPRISE:
CARBON
DIOXIDE
ABSORBING
MATERIALS
PROJECT RISE

The project is being funded under H2020-MSCA-RISE-2016 call of Horizon 2020.

BREAK-IT

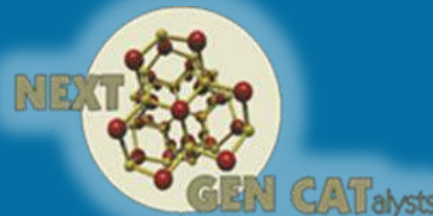
BREAK-IT:
BRINGING
RESEARCH
KNOWLEDGE TO
EXPLOITATION:
A T-SHAPE
ITINERARY
APPROACH

The project is being funded under EIT RAW MATERIALS - KAVA CALL 4

PROMETHEUS-I

PROMETHEUS:
PLATINUM GROUP
METALS SAVING BY
MONOLITHOS
EFFICIENT &
DISRUPTIVE
CATALYST
INNOVATION

*The project was funded
under SME Instrument
(Phase I) call of Horizon
2020.*



NEXTGENCAT:
DEVELOPMENT OF
NEXT GENERATION
COST EFFICIENT
AUTOMOTIVE
CATALYSTS

*The project was funded
under FP7-NMP-2011-
Small-5.*

<http://www.nextgencat.eu/>

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/>

R & I COLLABORATORS

MONOLITHOS



Johnson Matthey



CENTRO
RICERCHE
FIAT



UNIVERSITÀ
POLITECNICA
DELLE MARCHE



Env-Aqua Solutions



UNIVERSITÀ DEGLI STUDI DI SASSARI



PUBLICATIONS

- I. Yakoumis et al., 2016, "Tubular C/Cu decorated γ -alumina membranes for NO abatement", Journal of Membrane Science, doi:10.1016/j.memsci.2016.05.047
- G. Kolliopoulos et al., 2014, "Behaviour of platinum group metals during their pyrometallurgical recovery from spent automotive catalysts", OALib Journal, doi: 10.4236



INVITED LECTURES

- Lisbon Training Scholl (6-7/2/2017), Lecture title: "Financing innovative SMEs in the area of critical raw materials".
- 2016 EMRS (European Materials Research Society) Spring Meeting, Lecture title: "Substitution and Recycling of Critical Raw Materials from Catalytic Emission Control Devices in the Automotive Sector".
- 21st International Workshop of TACEC Programme, 2014, Lecture title: "How to treat catalyst to recover precious metals and rare earths".
- University of Padova, 2014, Lecture title: "Critical Materials and Automotive Catalytic Converters: From substitution to recycling".



KEY-NOTE CONFERENCE PRESENTATIONS

- 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".

