PLATIRUS newsletter

One year ago, for the first time in history, five of the major research centers in Europe started collaborating in developing and fine-tuning the most advanced recovery processes for PGMs. This joint effort, called The PLATIRUS project, has led to a unique exchange of know-how and best practices between researchers all over Europe, aiming at the selection of the recycling process and the preparation of the Blueprint Process Design that sets the basis for a new PGM supply chain in the EU.

PLATIRUS is heading into its second year. Continue reading the newsletter and find out more about current work and plans for next year.

The Project

PLATIRUS aims at reducing the European deficit of Platinum Group Metals (PGMs), by upscaling to industrial relevant levels a novel cost-efficient and miniaturized PGMs recovery and raw material production process.

The targeted secondary raw materials are auto catalysts, electronic waste (WEEE) and tailings and slags from nickel and copper smelters. This will open up an important range of alternative sources of these critical raw materials, with the potential to substitute a large amount of primary raw materials which are becoming more and more scarce in Europe.

The PLATIRUS team expects a future impact of 15% additional exploitation of currently untapped secondary resources, increasing the amount of yearly supplied PGMs by 4 tons, hence potentially fully covering the European supply deficit.

A look back at the first year

During the first year of PLATIRUS, the consortium investigated different leaching technologies for the recovery of PGMs from auto catalysts and developed a set of deep eutectic solvent-based formulations with very good PGM leaching capability. TU Wien investigated the PGM leaching ability of different families of ionic liquids and deep eutectic solvents. Meanwhile, KU Leuven developed novel solvometallurgical processes for the dissolution of PGMs. VITO applied microwave assisted roasting and leaching to recover efficiently PGMs from automotive catalysts.

PLATIRUS has already started developing innovative liquid-liquid and solid-liquid extraction methods for the separation of PGM's from leachates. The usage of various separation methods is currently being explored on single PGM solutions, synthetic solutions or actual leachates.

SINTEF focused on the optimization of the pyrometallurgical pre-treatment of the spent catalyst material. The PGMs from the metallic fraction will be subsequently separated electrochemical methods using a high-temperature molten salt. Moreover, SINTEF has established the theoretical conditions for the in-situ chlorination of the spent catalyst material using a molten salt reactor.

VITO demonstrated that the gas-diffusion electrocrystallization process (GDEx) achieved 100% removal of Rh and Pd from pure solutions and recovery as an oxide product.

TECNALIA has worked in the electrodeposition of PGMs from ionic liquids and DES solutions. Up to now, the deposition of Pd metal has been successfully achieved from some of the solutions.

The consortium focused on delivering sustainability assessments of the lab processes that were developed by various partners. This review has looked at the chemical toxicity, hazards, and safety, along with general energy consumption, and economics of the proposed processes.

Overall, the results obtained so far are very promising. Some of these technologies have led to leaching efficiencies up to 99% for Pt and Pd and 77% for Rh which are equivalent, or even better than some traditional leaching technologies.

More information about PLATIRUS' first year can be found on the download section of the PLATIRUS website.

Spent catalytic converters provided to partners

A substantial quantity of spent catalytic converters has been processed and provided to RTO partners by MONOLITHOS, securing the supply of material of known PGM concentration, for contacting leaching/separation/recovery studies. More specifically

- A consignment of 1400 spent ceramic catalytic converters has been processed
- 100 spent ceramic catalytic converters have been sorted and processed (reference feedstock)
- 15 identical catalytic converters have been sorted and processed (incorporating a PLATIRUS customized approach) for VITO/SINTEF full monolithic brick samples
- 20 CRFiat catalytic converters have been processed
- 29 samples (in powder form) (image 2) of the total weight of 28.071kg have been provided to partners
- 2 samples in monolithic brick form of the total weight of 9.9kg have been provided to VITO/SINTEF
- More than 86kg of processed milled spent monolithic powder have been stored for future use.

PLATIRUS M12 meeting & clustering workshop

From October 25th until October 27th of 2017, The PLATIRUS M12 project meeting was held in Turin, Italy. The first day of the meeting was dedicated to technical workshop among R&D and industrial partners to discuss the preliminary flow sheets of each technology. Day two was dedicated to the consortium meeting to review the project´s progress for each WP. The third day was dedicated to PLATIRUS´ first clustering workshop with selected projects under H2020 and FP7 programs.

Five other projects (IMPACT, SCALE, CHROMIC, SLIM, ITERAMS) were identified under the same call with PLATIRUS and had three discussions with all coordinators of those projects. Therefore, for the first clustering workshop, two projects under the same call with PLATIRUS (IMPACT, CHROMIC), as well as three other related projects under H2020 and FP7 (ProSUM, REE4EU, EREAN) were selected and invited for the first workshop. The questionnaire, based on the methodology of clustering together in strategic and technical levels, was circulated among above-selected project coordinators and gathered information.

What to expect in the coming period?

In the coming period, ENV will analyze the first technical workshop´s flow sheets and make a summary to narrow down the different routes of the PGM extraction, separation and recovery processes. Based on the outcomes, this will lead to a technical discussion with SINTEF in December and proceed for another technical workshop in January 2018.

Partners will further concentrate on the optimization of each technology. TECNALIA will focus on the optimization of the leaching using their most promising deep eutectic formulations. TU WIEN will work in the optimization of leaching conditions using the ionic liquids which have shown better leaching efficiency so far. KU Leuven will further optimize their developed solvometallurgical processes and use the obtained leachates as input for solvent extraction. As for VITO, they will further optimize microwave assisted roasting and their leaching systems to increase the PGM leachability and leaching selectivity and to optimize their energy and material use.

SINTEF will demonstrate experimentally the extraction of PGM using chlorination mixtures in a molten salt reactor. Moreover, SINTEF will continue focusing on the electrochemical extraction of PGM from the metallic fractions obtained after pre-treatment of the spent catalysts by pyrometallurgical methods.

VITO will work on the recovery of Pt, Ru and Ir from relevant mixtures resulting from separation/leaching activities from other partners, using the gas-diffusion electrocrystallization process (GDEx).

In the coming months, TECNALIA will focus in the optimization of the electrodeposition parameters from such solutions in order to maximize the recovery efficiency as well as in the PGM electrodeposition from other ionic liquids/DES resulting from which have not been studied yet.

PLATIRUS will further optimise the studied separation methods to increase the selectivity for PGM’s over the impurity metals. Furthermore, the developed separation processes will be tested on a variety of leachates with different compositions to test their compatibility.

The main environmental assessment will be determined through the use of Lifecycle assessments (LCA). Over the coming year the team will focus on collecting data and defining the scope and boundaries of the assessments.

PLATIRUS at the Annual CRM Event

PLATIRUS was proud to be part of the first Annual Critical Raw Material event at the Raw Material Week 2017 in Brussels. The day event offered the opportunity of learning and networking with key stakeholders in the field of Critical Raw Materials, co-organized by the European Commission and Horizon 2020 projects PLATIRUS, SCRREEN, CHROMIC, EQUINOX, INREP, and SCALE.

Other CRM news

CRM list

The new list of Critical Raw Materials was published the last 13th of September. The new list has 27 materials in total (nine more than before) and updates the 2014 list. Details about the methodology that is used to choose these materials can be found in the Background Report. For the first time, individual assessment results are available for grouped metals including PGMs.

Launch of Responsible Platinum and Palladium Guidance

The London Bullion Market Association scheduled for the end of 2017 the launch of its Responsible Platinum and Palladium Guidance (LBMA Annual Review, 2017). "*The development of these standards was a result of industry demand and involved wide stakeholder consultation*". These new standards have been drafted by the London Bullion Market Association.

Palladium price doubled

The price of Palladium doubled since January 2016 (JM chart). Reasons for this price increase can be attributed to a robust car industry, the Volkswagen scandal (that affected the reputation of diesel cars) and the current low *threat* posed by electric cars in the market.

CRM events

Raw materials week (6 - 10 november 2017)

The Raw Materials Week is centred around a series of events organised by the European Commission addressing the latest news regarding raw materials in the EU

18TH INTERNATIONAL ELECTRONICS RECYCLING CONGRESS IERC 2018 (17 – 19 January 2018, Salzburg, Austria)

The IERC 2018 is the recycling industry's most important event, bringing together over 500 experts discussing the latest recycling technologies, regulations, manufacturing processes and value of raw materials

Metals Recycling Event (11 to 12 July 2018, Stoneleigh, UK)

MRE is a trade show that dedicated to metals recycling. The Metals Recycling Event will bring the industry together under one roof creating new relationships and driving the industry forward.

European Refining Technology Conference (13-15 november 2017 in Greece)

ERTC is a platform that technology providers use to present their latest & new innovations and technologies

Prague Seminar 2017: What will our metals future look like in Europe? (13-14 November 2017)

The annual Seminar is focusing on "What will our metal's future look like in Europe". This will cover multiple topics including changes in the market, new technologies and processes as well as new products

Stay updated about PLATIRUS

If you like to know more about the PLATIRUS project, please visit the PLATIRUS website. Here you will find interesting reports, news updates and events. E-mail info@platirus.eu to subscribe to the newsletter.

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