European Tyre Recycling Association

CALL OUTLINE

Call:	**H2020**
Call Identifier:	CE-SC5-07-2018-2019-2020
Publication Date:	27 October 2017
Type of Action:	IA Innovation action
Focus area:	Connecting economic and environmental gains - the Circular Econonmy (CE)
Topic:	Raw materials innovation for the circular economy: sustainable processing, reuse, recycling and recovery schemes
Deadline:	**November 2019**

PROJECT OUTLINE

Project Duration: 48 Months

Project budget: Under definition

EC Contribution: 70% to 100% of eligible costs.

Partners

N:	ORGANIZATION	ROLE	ACTIVITY
1	ENEA	Project Coordinator	Technology provider, gasification plant and plasma torch experimental tests
2	ETRA	Interface between tyre recycling sector, technology provider, end users. Exploit-ation and Dissemination.	European Association for tyre and rubber recycling
3	New partner to join	to install the 350 kWe plasma torch plant downstream of the tyres thermal treatment plant	Pyrolysis Tyre Recycler
4	Electra 06	Plasma torch Industrial partner producer	Production of a 350 kWe plasma torch module
5	Liqtech	Industrial end user of SiC powder	Production of SiC manufacture and trading
6	IMEC	Academic partner with knowledge and skills in plasma torch processes for ceramics synthesis	Support in the design of aplasma torch, plasma torch tests

Project objective:
The overall objective of the project is to introduce a cost-saving and eco-friendly thermal process by piloting and validating a novel technology that can convert post consumer tyre waste into high quality SiC materials. The piloting and the validating activities will take place at industrial scale.

The technology used has been developed and validated under a previous EU Research Project done by the same core group of partners.

Expected results:

- Improvement and adaptation of an already existing thermal treatment plant (for pyrolysis / gasification) in order to obtain raw materials (char) and the power necessary for the project. Overall, it is necessary that this plant can produce about 400 kWe to self-produce all the necessary power without drawing electricity from outside (Electric Supplier).

- Development and installation, as appendix of above plant, of a 350 kWe plasma torch plant able to produce 50 tons/year of high quality sub-micronic SiC powder by using pyrolytic char, silica source and the power obtained from the thermal treatment of 1.400 tons/year of post consumer tyres. The output of 50 Tons/year of SiC is from one module. In an industrial infrastructure the SiC output can be duplicated, triplicated, etc.

Abstract

The markets for Silicon Carbide (SiC) are broad, global and growing. Research illustrates how, throughout the 20th Century, SiC usage grew and evolved into an essential ingredient for many of the most sought after high-tech, high performance products and applications – from metallurgy to ceramics, as well as abrasives and electronics. As these sectors have grown, manufacturers around the world have sought new material sources.

For all of its progress and contributions to energy saving technologies, SiC production remains an energy intensive material to produce. As pressures increase to reduce CO_2 emissions, new ways are being sought to reduce environmental impacts while maintaining consistent, high performance materials. Until recently, few options appeared viable.

The TyGRe project was designed to demonstrate the feasibility and sustainability of creating these high-value-added materials from waste as a means of reducing reliance upon virgin resources and increasing resource efficiency in the European Union. Specifically, the project relied upon material inputs from post-consumer tyres as a replacement for virgin carbon materials.

To date, the project has demonstrated that Silicon Carbide materials can be produced not only effectively and efficiently, but sustainably and economically, as well. The results of the research activities undertaken during the TyGRe project indicated that the concept of fulfilling future resource needs by material recycling of prevalent waste streams, is not only innovative, but possible and sustainable.

The aim of the project was to demonstrate the feasibility of the waste tyre gasification system coupled with the plasma torch for the production of sub-micronic Silicon Carbide. Another aim was to exploit markets for commercial quantities of consistent, high performance SiC materials.

The TyGRe project has demonstrated a means of producing high quality commercially viable Silicon Carbide-like material while providing potential resolutions for a variety of issues of importance to the European Community – both commercially as well as environmentally. The project has anticipated that with continuing refinement of the processes used, the TyGRe project will be capable of providing a continuous source of high-grade SiC for high performance SiC products.

The purpose of the new project is to capitalise and exploit the knowledge achieved through the TyGRe Project by bringing it to an industrial scale through an modular prototype facility.

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