



RawMaterials

Connecting matters

Pitch session for KAVA Call 9

Brokerage Event & Expert Forum³ | 13-14 October 2021



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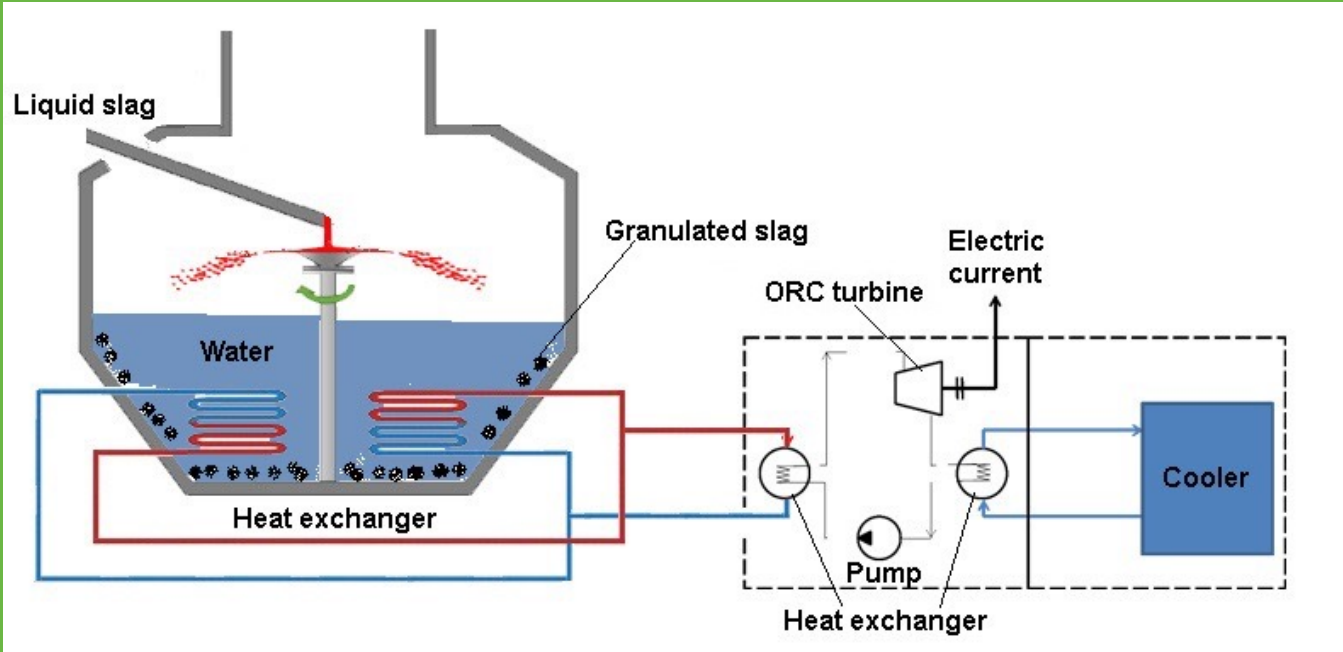
HEAT RECOVERY from SLAG

The metals industry is one of the most energy-intensive industries. For this reason, it is under constant pressure to increase energy efficiency, reduce energy consumption and lower its carbon footprint.

- The proposed solution assumes energy (heat) recovery from metallurgical slag during its granulation.
- This solution is based on the use of an appropriate construction of the granulator equipped with heat exchangers.
- Heat exchangers allow to recover heat from slag during granulation process and transfer it to the working medium (e.g. thermal oil).
- The working medium will be used to power the ORC system in which electricity energy will be produced.

SHORT DESCRIPTION OF THE IDEA –

HEAT RECOVERY from SLAG



- Heat recovery from granulated slag through the water to working medium (e.g. thermal oil) is estimated in 50% efficiency.
- Recovery of heat from working medium (e.g. thermal oil) in ORC turbine and electric energy production is estimated on 20-30% efficiency.

THEMATIC SCOPE OF THE PROJECT PROPOSAL

Category of activity:

- Education/Upscaling/RIS

Link with the topics addressed in KAVA Call 9:

- **Raw Materials and Circular Societies Lighthouse:**

- **Resource and Energy efficient in metallurgical and Mineralogical processing**

The project is focused on rises an energy efficiency of the metallurgical processes by use of waste heat. This will be achieved by recovering heat from smelter slags. Project will also allow to reduce greenhouse gas emissions by lowering the he overall electricity consumption of the entire plant.

- **Current status of the proposal:**

- Potential consortium members from the copper and steel industry were acquired
 - Cooperation with a research and development unit from the steel industry was established

- **Type of expertise requested**

- Research unit that will help to select the appropriate working medium in the heat exchanger
 - Industrial partner to supply the pilot plant

SHORT DESCRIPTION OF THE IDEA –

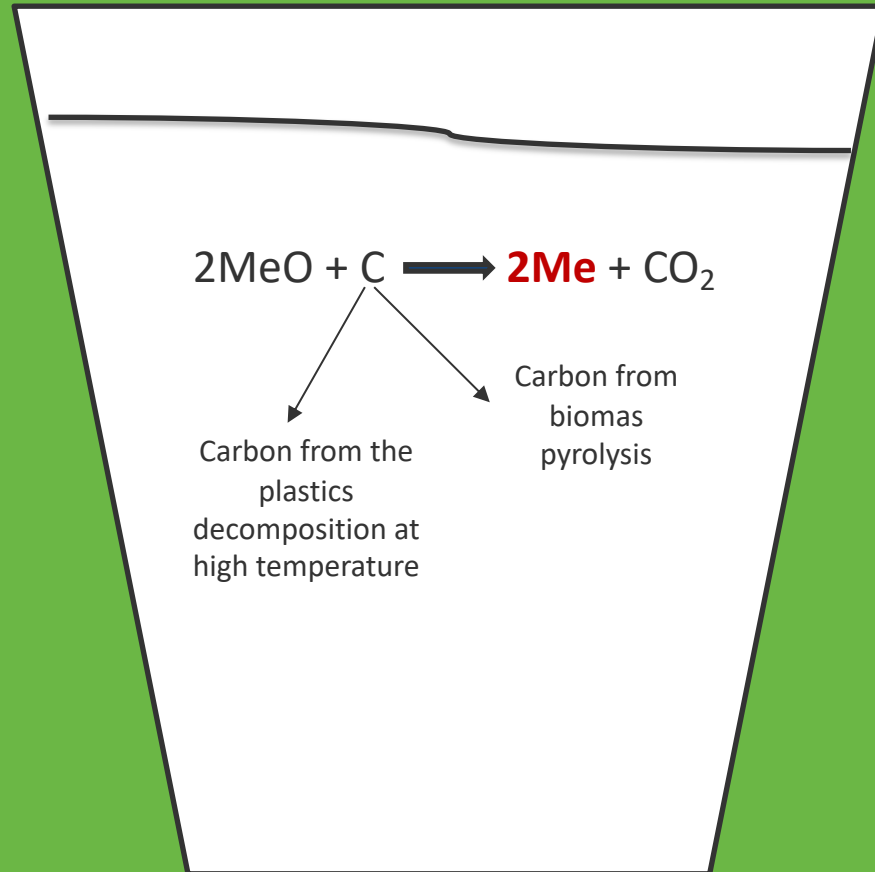
PCB and BIOMASS as a REDUCER

Nowadays, non ferrous metallurgy is struggling with pressure of reducing footprint. One of the way to achieve this is replacement metallurgical coke with alternative reducing agent.

- The concept of the project will include the development of technology for lowering of consumption of metallurgical coke in non ferrous smelters.
- This will be achieved by replacement of metallurgical coke by printed circular board and carbonized biomass as a reducer agent.
- The approach proposed in the project assumes utilization of plastics contained in PCBs as a useful material rather than waste, by using them to reduce metal oxides contained in metallurgical slags.

SHORT DESCRIPTION OF THE IDEA –

PCB and BIOMASS as a REDUCER



- The application of PCBs as a reducer of metallurgical slags will provide additional benefits in form of recovery of valuable metals accompanying PCB scrap (e.g.: Cu, Ag, Au).
- Carbonized biomass will be applied as a reducing agent, protect top of the slag against reoxidation of reduced metal and heat lost during the process.

THEMATIC SCOPE OF THE PROJECT PROPOSAL

Category of activity:

- Education/Upscaling/RIS

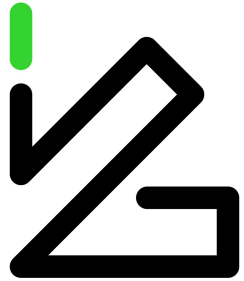
Link with the topics addressed in KAVA Call 9:

- Raw Materials and Circular Societies Lighthouse:
 - **Recycling of end-of-life products containing Strategic Materials and/or CRMs**
 - **Resource and Energy efficient in metallurgical and Mineralogical processing**

Printed circuit boards contain a significant amount of plastic, which decomposes at high temperatures with the release of hydrocarbons. Hydrocarbons will be used as a reducing agent of metal oxides contained in the slag. In high temperature, where plastic decomposes the, precious metals will be melted and recovered with the reduced metal from slag. Addition of carbonized biomass will reduce use of metallurgical coke and lowered footprint.

- Current status of the proposal:
 - Potential consortium members from non-ferrous metal industry
 - Cooperation with the R&D University in the field of biomass application
- Type of expertise requested
 - Industrial partner interested of application of the developed technology
 - Industrial partners specilized in recycling of PCB

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