BMWi-Project ReOrgAl

Project's start: 01.05.2019

Topic

Energy and resource efficiency optimization on a recycling process for organic contaminated aluminium scrap

It is the goal to minimize the primary energy consumption and maximise metal yield by prozess optimization of combined thermal pre-treatment and melting of organic contaminated aluminium scrap. This is to be achieved by efficiently using the thermolysis gases of thermal pre-treatment, which has not been achieved by industrial processes, yet. The process optimisation is based on the fundamental investigation of a microwave rotary furnace for thermolysis of aluminium scrap, the development of a process control system for thermolysis gas combustion and the technical comparison of three industrial melting processes. With this process development and the generated data set, the transfer into pilot scale is possible after the project. The data set will be available for equipment manufacturers and industrial users, enabling industrial application and market-driven distribution.

The project will be organised between the RWTH Aachen University departments IOB and IME, as well as the industry partners Fricke & Mallah (F&M), Hydro Aluminium Rolled Products GmbH (Hydro), Otto Junker GmbH (OJ), WS Wärmeprozesstechnik GmbH (WS), TRIMET Aluminium SE (TRIMET) and LOI Thermprocess GmbH as associated member. The project is scheduled over three years, organised in six work packages (AP) and six mile stones (MS). MS 1 is the adjustment of project goals to current market needs and definition of relevant boundary conditions. Ms 2a is the characterisation of thermolysis gases from the thermal pre-treatment in the microwave furnace build by F&M at IME. With this characterisation, necessary synthetic gases can be ordered for thermolysis gas burner tests. MS 2b is the measurement of metal yield after lab-scale melting experiments with pre-treated scrap

at IME. MS 3 is the test of thermolysis gas burners at the Mega- FLOX® laboratory rig at WS. MS 4 is the analysis and comparison of metal yield of the industrial melting experiments (induction furnace and two reverb. chamber furnaces), conducted with the same scrap input. MS 5 is the compilation of comparable energy and mass balances of the melting experiments in a transparent data set.