



Plant development for automated extraction of particles from liquids with a low solid content by enrichment and drying

According to latest research there are no suitable methods for a complete separation of particles from liquids with a low solid content such as liquids containing loaded powdered activated carbon. Within the research project "charcoal-proof" in cooperation with the Institute for Manufacturing Technologies of Ceramic Components and Composites of the University of Stuttgart a successful detection of powdered activated carbon by thermogravimetry and helium pycnometrie was possible. To gain enough solids as sample for these analysis methods a suitable method for the enrichment of activated carbon particles is required. Furthermore enrichment of other solids from suspensions with a lower solid content can be of interest.

The project goal is to develop a compact and marketable enrichment device for the extraction of solids from liquids with a very low solid concentration by using membrane separation technology. An automated operation to increase the economic efficiency for users is intended. Fields of application are laboratory analytics and recovery of valuable resources in general.

The required parameters for the development of a filtration and drying unit are determined by accompanied laboratory analysis during operation of the pilot device. To increase the efficiency of the enrichment process gradually, support by modellings are done by projectpartner SAG-Ingenieur GmbH during the project. On the basis of computational fluid dynamics (CFD) the geometry of the filtration unit will be adjusted on various procedural requirements by project partner novoflow GmbH. Following this a prototype will be produced. The ISWA will operate the research device during the entire project period and later the prototype. Meanwhile various procedural methods will be performed on the enriched particles to conserve substances during the drying process as effectively as possible. The dimensioning of the filtration and drying unit will be based on research results of selected measurement methods to characterize membrane materials and particles which are relevant to the process as well as the modelling. The construction and installation of the enrichment device will be completed with both units, technical linking and integration of the process control.

Financing Institution:
AiF Projekt GmbH, Central Innovation Programme for SME, funded by the Federal Ministry for Economic Affairs and Energy (BMW)
Contact:
Dr.-Ing. Uwe Menzel Dr.-Ing. Sebastian Platz
Project partner:
Institut für Fertigungstechnologie keramischer Bauteile (IFKB) der Universität Stuttgart, novoflow GmbH Umwelt- und Filtertechnik, Rain am Lech, SAG Süddeutsche Abwasserreinigungs-Ingenieur GmbH, Ulm
Duration
11/2015 – 01/2018