Master thesis in cooperation with Omya

Evaluating the potential of Omya's minerals for catalysis in different industries

Alkaline or alkaline earth carbonates, and especially calcium carbonate, are widely used in pigment coating formulations for paper or paper-like materials as well as in pigment surface coatings or paints for other materials such as metal, wood or concrete. Such coatings can improve the surface properties of the underlying substrate, can have a protective effect or can add additional functionality to the substrate.

Modified or functionalized calcium carbonate is an Omya development to generate recrystallized calcium carbonate/calcium phosphate compounds with tailor-made properties, e.g. pore size distribution, specific surface area or other structural properties.

Recent research results have found interesting properties of specifically surface modified synthetic minerals from Omya for several chemical reactions, typically requiring catalyst in the production process.

Catalysts are widely used in the Chemical Process Industry (CPI), e.g. for cracking processes in the petrochemical industry, for the synthesis of organic molecules, or the reaction of organic or inorganic compounds. For the industrial application besides the chemical selectivity of a reaction also handling properties like attrition, lifetime or sensitivity to impurities are of utmost importance.

The goal of this master thesis is to support the technical development with relevant market information and to estimate the potential in different industries. The thesis will analyze different applications in different industries for their suitability to use Omya's mineral based catalysts to replace existing or to create new manufacturing methods. It will identify burning platforms, describe unsolved problems and articulate unmet needs in the different markets. These data will be combined with economic indicators about the respective markets including market size, growth rate and attractiveness. The compiled information will ultimately allow to prioritize the ongoing technical development work and guide the research activities from a commercial standpoint. The result of this master thesis will be a recommendation for new internal start-up's ("incubators") in this field of mineral based catalysts including a technical analysis, a marketing concept and a resource plan.

The master student will collaborate intensively with Omya's R&D personnel working on the development of the different applications of the mineral based catalysts to understand the fundamental aspects of the technology. Desk- and field research will provide the information to identify and understand existing and new applications that can use Omya's minerals. A regular interaction with specialists who are experienced in marketing some of the applications in different markets will provide the feedback needed to gauge technical- and commercial findings.

The duration of the master thesis will be 9 months. It is expected that the student spends most of the time in Omya's HQ in Switzerland. The main deliverable of the master thesis is a business case for the potential use of Omya technology for catalysts.

Requirements: master student in the fields of

- Chemistry and Business Studies
- Industrial Engineer
- Chemical engineer or chemist with business background

start of the project: as soon as possible

If you are interested, please contact Dr. Sandro Olveira (Sandro.olveira@chem.uzh.ch)