MONITORING COMPLEX MICROSTRUCTURE FORMATION NON-INVASIVELY IN-FLOW

sagentia

THE CLIENTS PROBLEM

Our client, a multinational corporation, wanted to better understand their waste-water treatment process, and ensure that it was safe, efficient and in line with regulations. In order to remove suspended solids, the client would in-line dose coagulants and flocculants, causing the solids to agglomerate and be easily separated.

However, the coagulant dosing must be precise – too much or too little added coagulant could cause a failure of the flocculant, leading to ineffective filtration. The required dosing would change regularly and unpredictably, based on a variety of processing parameters; manual testing was required to determine the correct dosing level.

In this project, Sagentia was asked to identify, invent and develop a sensor that would enable precise dosing of the coagulant on an in-line, automated basis, in a robust and reliable fashion.

HOW WE HELPED

Sagentia reviewed the physics and chemistry of the coagulant addition process to understand what changes take place, and how an end-point might be defined.

Considering the underpinning physical effects, we identified Zeta-potential as a key parameter that could be measured to determine the amount of coagulant required – however zeta-potential is a challenging measurement task, usually requiring an electrochemical test, which is not robust or long lived.

Our team of applied sciences led a concept generation session on alternative ways of measuring zeta-potential, focused on the fundamental physiochemistry of a suspended solid system. Selecting systems for utility in long-term, robust monitoring environments; we developed a new sensing mode with no electrochemistry measurement or moving parts.

Sagentia managed the project through multiple phases of risk reduction – progressing the designs from early proof-of-principle through to production prototypes for field-deployment, and developing the back-end infrastructure, electronics and algorithms to analyse the zeta-potential measurement in fast and reliable manner.

THE OUTCOME

Our system is the first-of-its kind – a long term sensor for a tricky physiochemistry parameter. With no moving or delicate parts and minimal need for calibration, it is suitable for deployment in tough environments. For our client, this provides a step-change in performance, minimising operator error and ensuring safety and regulatory constraints are met.

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