REMOVAL OF MICROPLASTICS CURRENT RESULTS FOR A RESOURCE-EFFICIENT, SUSTAINABLE AND ECONOMICAL SEPARATION TECHNIQUE OF MICROPLASTIC PARTICLES IN MUNICIPAL WASTEWATER TREATMENT PLANTS

Katrin Schuhen
Adrian Herbort
Michael Sturm
University of Koblenz-Landau ,Landau, Germany
Benedikt Ney
Zahnen Technik GmbH

Abstract
The concept for removing microplastics from wastewater consists of two steps. Cloud- Point Technology, which is already known from nanotechnology, provides the basis. The capture unit (CU), the bioinspired part of the whole molecule, forms the backbone. It is characterized by a characteristic preorganization and the ability to interact with the material to be included via the functional groups introduced. This makes it possible to first locate the particles in one place. The CU is finally implemented in the second partial step to the inclusion compound (IC) by the fixation unit. Inter alia, alkoxysilyl-functionalized substituents serve to establish the desired three-dimensional network structure, which is induced by contact with the effluent sol-gel process. In 2016 it was possible to confirm the conceptual approach on a laboratory scale for the first time. By adding inorganic-organic hybrid precursors, particle growth is initiated, forming agglomerates that are 10,000 times the original volume. A successful scale-up of the experimental setup into a 2000 l batch reactor confirmed the findings from the laboratory experiments. Again, particle growth was observed. Currently, a larger continuously working pilot plant is being installed to transfer the batch process to continuous process control. Previous research dealing with the removal of reactive organic stressors will be combined with the presented technique.

Keywords: Microplastics, Elimination, Cloud-Point-Technology, Particle Growth

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