4th International Conference on **Pollution Control & Sustainable Environment**

&

6th Edition of International Conference on **Water Pollution & Sewage Management**

July 26-27, 2018 Rome, Italy

Eduard Rott

University of Stuttgart, Germany

Tobias Reinhardt, Stephan Wasielewski and **Ralf Minke**

University of Stuttgart, Germany

Organophosphonates: Environmental problems related to them and possible solutions for their elimination from industrial wastewater

Organophosphonates - mainly PBTC, HEDP, NTMP, EDTMP and DTPMP - are increasingly gaining attention of environmental authorities and scientists. These compounds are used in a wide range of industrial and household applications due to their excellent complexing properties. Organophosphonates are associated with various environmental issues. For example, phosphate, which has an eutrophication effect on water bodies, can be formed by their abiotic degradation. In addition, they are associated with heavy metal remobilization in waters, make it more difficult to comply with strict P discharge targets in wastewater treatment plants (WWTPs), and in individual cases interfere with the operation of WWTPs due to complex formation. It is estimated that in 2012, with a consumption of 49,000 t/a in Europe, organophosphonates were discharged at 9000–18,600 t/a into European waters via inadequately purified industrial wastewater and municipal WWTPs. The elimination of organophosphonates specifically from industrial wastewaters is therefore strongly recommended. Wastewater contaminated with organophosphonates can be roughly divided into two categories. On the one hand, there are concentrates, e.g. from membrane filtration and cooling water treatment, where phosphonates are used as antiscalants and hardness stabilizers. On the other hand, there are mainly organically contaminated wastewaters containing phosphonates from industrial cleaning agents or, e.g., from paper and textile industries, where phosphonates are used as bleach stabilizers. This wide variety of possible wastewater matrixes requires different approaches in terms of the objective to eliminate organophosphonates from industrial wastewater. The presentation will compare different wastewater treatment processes (precipitation/flocculation with Fe^{III} or $Ca(OH)_2$, (photo-)Fenton, UV/Fe^{II}, filtration) and will present the effects of the wastewater matrix on these processes. For example, the presence of Ca^{II} promotes the adsorption of phosphonates on iron hydroxides. Furthermore, organophosphonates can impede the precipitation of iron hydroxides due to their complexing properties.

Recent Publications

1. Rott E, Steinmetz H and Metzger J W (2018) Organophosphonates: A review on environmental relevance, biodegradability and removal in wastewater treatment plants. Science of the Total Environment 615:1176-1191.
2. Rott E, Minke R, Bali U and Steinmetz H (2017) Removal of phosphonates from industrial wastewater with UV/FeII, Fenton and UV/Fenton treatment. Water Research 122:345-354.
3. Rott E, Minke R and Steinmetz H (2017) Removal of phosphorus from phosphonate-loaded industrial wastewaters via precipitation/flocculation. Journal of Water Process Engineering 17:188-196.

Biography

Eduard Rott has completed his PhD in the field of Environmental Engineering at University of Stuttgart, Germany. He is working as a Postdoctoral Scientist in the Institute for Sanitary Engineering, Water Quality and Solid Waste Management at University of Stuttgart, Germany.

eduard.rott@iswa.uni-stuttgart.de