

Ozone in combination with other technologies for industrial applications and the treatment of industrial wastewater

El ozono en combinación con otras tecnologías para aplicaciones industriales y el tratamiento de aguas residuales industriales

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Abstract

The proposed lecture deals with the use of ozone, alone or in combination with other technologies for industrial applications. It is today a reality that the design of new industrial goods production lines must take into consideration environmental impact aspects. It therefore entails also the problem of the quality of wastewater generated and its treatment, mainly but not only, with respect to the abatement of chronic toxicity. Ozone, alone or in combination with other technologies, is for example being used in the pulp and paper industry, both for pulp bleaching and for wastewater treatment, so contributing to mitigate the environmental impact on the surroundings. This paper presents industrial applications of ozone, with consideration not only of the task to be performed, but also addressing the chemistry between the ozone and the compounds to be reacted with, the resulting by-products, the chemical kinetics, the hydraulic pattern and hydrodynamics of the ozone diffusion and reaction chambers, the resulting mass-transfer pattern and the overall kinetics. This optimization is the more important, since unlike for drinking water treatment,

- Ø the ozone dosages for industrial applications are much higher,
- Ø the Total Organic Carbon TOC Matrix is present in much larger concentrations,
- Ø and non negligible concentrations of solid particles may have to be considered.

Useful theoretical considerations are presented and are compared with experimental and operational results from pilot plants, respectively industrial systems in operation. Another consideration of the essence is system's optimization with respect to energy consumption and costs.

Keywords: ozone, industrial wastewaters, total organic carbon, environmental impact, ozone diffusion, reaction chambers, mass-transfer pattern.