STOPPED-FLOW ANALYSIS IN WATER TREATMENT

WHAT IS WATER TREATMENT?

Water has an extremely large number of uses but it is often not in a suitable condition for these uses when extracted from the environment.

Water must be treated to remove contaminants that may, for example, be harmful to human health or industrial processes.

Wastewater must also be treated to allow it to be recycled, or safely returned to the environment.

METHODS OF WATER TREATMENT

CHEMICAL

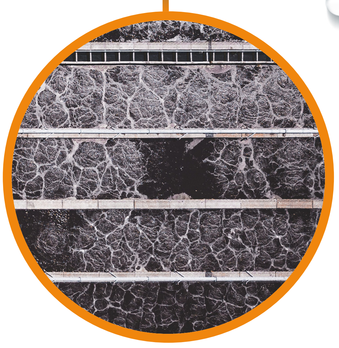
Treatments such as chlorination for removing bacteria, viruses and other pathogens.

PHYSICAL

Methods such as filtration and dissolved air flotation to remove particles and suspended solids from the water.

BIOLOGICAL

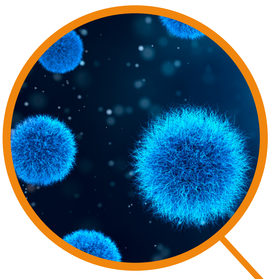
Slow sand filtration can be used as a method of adsorbing soluble components and trapping particulates.



CHLORINE-BASED WATER TREATMENT

Free chlorine is the most widely used chemical disinfectant in the world.

Due to its high effectiveness against pathogens, good stability and low price it is used extensively in water and wastewater treatment.



USING STOPPED-FLOW IN CHLORINE-BASED WATER TREATMENT

The chlorination of micropollutants occurs too fast to be observed by conventional methods, such as quenching and measuring at defined intervals.

Traditional methods like this are time consuming and require a series of steps and operations to yield a result.

Stopped-flow spectroscopy allows for immediate and continuous observation of extremely fast reactions such as chlorination.

Using a competition kinetics method (utilising a reference with a known rate constant) stopped-flow can measure chlorination rate constants rapidly and accurately.

SX20 STOPPED-FLOW SPECTROMETER

Observe reactions on millisecond timescales

- Capable of measuring reactions on timescales of milliseconds to minutes
- Multiple absorbance and fluorescence detection methods available to use over a wide optical range
- Easy to configure modular design
- Low typical sample volume of 60 uL per reagent when mixing at equal volumes
- Faster and more robust decision making

IMPORTANCE OF WATER TREATMENT RESEARCH

With chlorination being so widely used as a water treatment method, analysis of reaction pathways and products of various pollutants during water chlorination has attracted a lot of attention.

Determining the reaction pathways and subsequent transformation of chlorination waste products has become important, with determination of the kinetic rate constants of micropollutants reacting with chlorine being a key first step in such research and analysis.

Being able to predict the efficiency of the removal of micropollutants and optimal conditions for doing so has the potential to change the water treatment industry in the future.

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