**Photocatalytic degradation liquide phase**

**Equipment**: Stainless steel photoreactors for the photocatalytic degradation of organic pollutants; Fluorescence detector and spectrophotometer for signal detection of the organic pollutants and kinetic measurements

**No. of Equipment:** UACH2

**Responsible coordinator:** Dr. Petra Ecorchard

**Name of Institution:** INSTITUTE OF INORGANIC CHEMISTRY OF THE AS CR, V.V.I. (Photocatalytic lab No. 22);  Department of Solid State Chemistry

**Address of Institution:**

Husinec-Rez c.p. 1001

250 68 Rez

Czech Republic

**E-mail:** ecorchard@iic.cas.cz

**Telephone:** 311236922

**Homepage:** https://www.iic.cas.cz

**Contact person (operator)**: Dr. Martin Šťastný

**E-mail:** stastny@iic.cas.cz

**Telephone:** 311236920

**Equipment Description**

**Description of equipment:**

* Set of **two photoreactors** for the photocatalytic degradation of organic pollutants (dyes, cytostatics, pesticides, etc.).

Specifications and technical features:

It consists of a stainless steel cover and an inner quartz tube with a fluorescent lamp (Narva, “Black Light” 365 nm) with power of 13 W producing a light intensity of ∼3.5 mW/cm2.

* **UV-VIS Spectrophotometer ColorQuestXE** for signal detection of the organic pollutants and kinetic measurements

Specifications and technical features:

* diffuse/8° geometry with automated specular component inclusion/exclusion
* For transmission measurement, the use of a robust CIE-conforming sphere instrument (TTRAN Total Transmission mode)
* The optical system has ae bandwidth of 10 nm and spectral data is reported every 10 nm. Tristimulus color calculations are performed from 400 nm to 700 nm
* **FL2000 fluorescence detector** (Spectra-Physics, ThermoFinnigan, U.S.A.)

Specifications and technical features:

* The FL2000 detector measures and records the fluorescence or phosphorescence signals emitted from some types of organic pollutants. Fluorescence occurs when the molecule is excited into a higher energy state by the absorption of electromagnetic radiation, and then decays to a lower state, releasing energy of a slightly different wavelength.
* The FL2000 detector can be programmed to change the excitation wavelength and the emission wavelength as a function of time.
* The detector signal (in mV) is normally zeroed at the beginning of a run (Autozero time of 0 minutes), and also should be zeroed at each wavelength change.

**Specification of expertise relevant to NanoEnviCz workpackages:**

**WP3**a,c,f, **WP4**a, **WP5**c, **WP6**a,b,d, **WP7**a,c,d,e, **WP8**a

**Detailed description of expertise**

**Please, specify the main research topics connected with equipment**:

The photocatalytic degradation and sorption of organic pollutants, studying the mechanism of degradation of organic pollutants, measuring the kinetic dependencies on surface of nanostructured metal oxides (TiO2, CeO2, ZnO, etc.) in aqueous solution using VIS spectrometry.

**Please, specify the secondary research topics connected with equipment**:

**Keywords describing research area:**

Photocatalytic degradation, sorption, organic pollutants, nanostructured metal oxides

**Competence**

**Relevance for applied and industrial research:**

Photocatalytic monitoring the degradation of organic pollutants on nanostructured metal oxides for catalytic wastewater treatment in industry. Monitoring the effectiveness of surface decontamination materials.

**Relevance for fundamental studies:**

Studying kinetics of photocatalytic (or sorption) reactions.

Studying the mechanism of degradation of organic pollutants.

Verification of the efficiency of the prepared nano-oxides for industrial purposes.