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4-nonylphenol belongs to the group of the environmental estrogens that act as the hormonal system of the body. It is present in waste water and sewage treatment plants fail to decrease the content of this compound.

The degradation of 4-nonylphenol was measured in two types of batch reactors: Beaker with TiO_2 bed (Fig. 1) and Erlenmayer flask with TiO_2 on glass beads in suspension (Fig. 2). The initial concentration of 4-nonylphenol was ranged between 8 to 12 ppm.

TiO_2 thin layers were prepared by the sol-gel process controlled in a reverse micellar environment. TiO_2 was synthesized by the addition of Titanium (IV) isopropoxide into formed inverse micellar solution made of cyclohexane, nonionic surfactant Triton X-114 and distilled water. The molar ratio of cyclohexane/Triton X-114/water/$Ti(OC_3H_7)_4$ was kept at 11/1/1/1 (volume ratio TX-114/cyclohexane = 0.49). Prepared solution was stirred intensively for homogenization and formation of inverse micelles. Then liquid Titanium (IV) isopropoxide was regularly dropped to the micellar solution during the vigorous stirring. TiO_2 films were deposited by the four cycles of the dip-coating method. Among the single dip-coating cycles the samples were thermally treated by calcination at 400 °C for 4 hours with the temperature

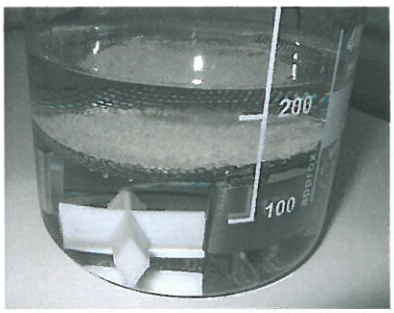

Figure 1. Batch reactor – Beaker with TiO_2 bed

Figure 2. Batch reactor – Erlenmayer flask

ramp 1 °C/min in the air flow in a muffle furnace. TiO_2 photocatalyst in the anatase crystalline form possesses surface area 70 m^2/g with the small content of micropores (V_{micro} = 15 mm^3/g) and the layer thickness 340 nm. For photocatalyst activation the medium pressure mercury lamp was used.

Experimental data show involvement of two degradation processes; photocatalysis together with photolysis. Photolytic process generates intermediates with high toxicity and estrogenic activity and therefore is desirable to minimize it. For suppressing of the photolysis process the special glass filter was applied to eliminate UV C and 80 % of UV B radiation. The endocrine disruptor degradation activity was compared together with selectivity for both arrangements with respect to the possible applications.