

# The highest efficiency of the thin film fixed bed photocatalytic reactor

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**1. Introduction** Photocatalysis has been already reported as an alternative method of water purification. Experimental works admitted, that even hazardous compounds may be degraded by this method. However, their efficiency was reported as not enough high. The thin film fixed bed photocatalytic reactor seems to be the most feasibility device, when it is operated under solar radiation. This simple apparatus can be considered as an alternative for expensive chemicals treatment or time-wasting and limited biodegradation.

**2. Experimental** - Therefore, the numerical simulation of this object has been realized. In this case the new two-dimensional mathematical model has been formulated. The stationary model is stated by parabolic partial differential equation. The solution was obtained by spectral discretisation by Chebyshev orthogonal polynomials and continued by the bifurcation and continuation tool – AUTO.

**3. Results and Discussion** - The results let us to predict the height of the liquid film, for which the maximal effectiveness can be reached. It indicates the narrow zone of parameters, for which the reactor should be operated under higher efficiency. The results has been compared with the conventional water purification techniques. It is shown, that it is possible to investigate the photocatalytical water treatment as an real alternative, when we will use both experiments and simulation.