Selective Photocatalysis Based on Molecular Recognition Sites

Yelena Segatelian, Sudeshna Ghosh-Mukerji and Yaron Paz

Department of Chemical Engineering,

Technion, Israel

Titanium dioxide is known to be a non-selective photocatalyst for the treatment of polluted air and water. An approach for obtaining selectivity, thus facilitating its use for the mineralization of hazardous, non-biodegradable contaminants is presented hereby. This approach is based on the construction of molecular recognition sites (MRS) anchored on inert domains in the vicinity of photoactive sites. These MRS are designed to physisorb or to chemisorb target molecules and to "shuttle" them to the photocatalytic sites. The feasibility of this approach was demonstrated by us recently. Here we present several examples demonstrating this approach, and discuss the influence of temperature, MRS stability, adsorption energies and difusion length on the performance of such devices.