PHOTOCATALYTIC DEGRADATION OF AMOXICILLIN ON TITANIUM (IV) OXIDE MODIFIED BY COPPER DEPOSITION

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Abstract

Emerging contamination of environmental waters by synthetic organic compounds requires forehand and serious engagement of available scientific and technological resources. The photocatalytic degradation of organic pollutants is a widely investigated and promising methodology, however, it still requires research input to systematize and improve the existing knowledge. TiO_2*-based photocatalysts modified by the deposition of noble metals, including Cu, are known for their remarkable ability to split water and generate hydroxyl radicals that can efficiently oxidize organic pollutants in the solution. On the other hand, despite its oxidizing ability to break carbon chains at heteroatomic sites, such generated hydroxyl-radical still does not have enough power to break aromatic structures in conventional laboratory experiments with low power lamps and several hours duration. In the present contribution, the degradation of a widely used antibiotic, amoxicillin on* TiO_2 *photocatalyst modified by deposition of Cu atoms, has been investigated using UV-Vis spectrometry. The obtained absorbance depletion with added catalyst was 31.5 % in the first 120 minutes of degradation, which was significantly faster than the degradation degree of the amoxicillin solution without catalyst (12.7 %). The observed changes were discussed from a mechanistic point of view by comparing UV-Vis spectra of the degradation process in the presence and absence of the photocatalysts. While the absorbance depletion mainly refers to the efficient breakage of the molecular chains at the heteroatomic sites, the residual absorbance originates from the stable aromatic structures that, besides the efficient generation of hydroxyl radicals, require an additional energetical input to be completely degraded up to the aliphatic structure.*

Keywords: *antibiotic, organic pollutants, photocatalysts,* TiO_2