

Impact of TiO₂ in Photolytic degradation of Pesticides in Wastewater

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Abstract: Removal by adsorption and photolytic degradation of organic pollutants from water are cost effective methods. But oxidation technologies are gaining interest as an effective approach for wastewater treatment capable of degrading a diverse spectrum of organic contaminants. The present-day assessment targets to focus on recent advancements in photocatalytic degradation of insecticides and main organic pollution. Photocatalysis is a promising advanced oxidation generation to relieve water pollutants troubles. Titanium dioxide(TiO₂) is the most popular photocatalyst due to its low price, nontoxicity, excessive oxidizing skills, and clean immobilization on various surfaces. The usage of TiO₂-based photocatalysts indeed, most of the strategies, which hired robust catalysts, confirmed and exhibited successful degradation of the pesticides beneath various situations. We agree with this topic of research is extremely crucial and could keep growing in current years, achieving final suitable outcomes and locate extra applications in special fields of take a look at.

Keywords: Photocatalysis; Pesticides; Water Treatment; Titanium Dioxide

REFERENCES

- [1]. D. Bahnemann, J. Cunningham, M.A. Fox, E. Pelizzetti, N. Serpone, in: G.R. Helz, R.G. Zepp,D.G. Crosby (Eds.), Aquatic and Surface Photochemistry, Lewis Publishers, Boca Raton, FL, 1994, pp. 261–316.
- [2]. A. Vidal, Chemosphere 36 (1998) 2593–2606.
- [3]. D.F. Ollis, H. Al-Ekabi, Photocatalytic Purification of Water and Air, Elsevier, Amsterdam, 1993.
- [4]. J.-M. Herrmann, Catal. Today 53 (1999) 115–129.
- [5]. I.K. Konstantinou, T.A. Albanis, Appl. Catal. B 42 (2003) 319–335.
- [6]. S. Yesodharan, M. Gratzel, Ber. Bunsenges. Phys. Chem. 89 (1985) 121–126.
- [7]. H. Yin, Y. Wada, T. Kitamura, S. Yanagida, Environ. Sci. Technol. 35 (2001) 227–231.
- [8]. C. Kormann, D.W. Bahnemann, M.R. Hoffmann, J. Photochem. Photobiol. A 48 (1989) 161–169.
- [9]. J.K. Leland, A.J. Bard, J. Phys. Chem. 91 (1987) 5076–5083.
- [10]. S. Yesodharan, V. Ramakrishnan, J.C. Kuriacose, Indian J. Chem. 19A (1980) 402–406.
- [11]. A. Pruden, D.F. Ollis, Environ. Sci. Technol. 17 (1983) 628–631.
- [12]. A. Sclafani, L. Palmisano, E. Davis, J. Photochem. Photobiol. A 58 (1990) 113–123.
- [13]. E. Pramauro, M. Vincenti, V. Augugliaro, L. Palmisano, Environ. Sci. Technol. 27 (1993) 1790–1795.
- [14]. K.S. Wissiak, B. Sket, M. Vrtacnik, Chemosphere 41 (2000) 1451–1455.
- [15]. H. Yoneyama, Y. Yamashita, H. Tamura, Nature 282 (1979) 817–822.
- [16]. K. Kogo, H. Yoneyama, H. Tamura, J. Phys. Chem. 84 (1980) 1705–1713.
- [17]. Y. Yamashita, N. Aoyama, N. Takezawa, K. Yoshida, Environ. Sci. Technol. 34 (2000) 5211–5214.
- [18]. R. Abe, K. Shinohara, A. Tanaka, M. Hara, J.N. Kondo, K. Domen, Chem. Mater. 9 (1997) 2179–2184.
- [19]. M. Arai, J. Phys. Chem. B 105 (2001) 3289–3294.
- [20]. C. Anderson, A.J. Bard, J. Phys. Chem. B 101 (1997) 2611–2616.
- [21]. D. Shchukin, S. Poznyak, A. Kulak, P. Pichat, J. Photochem. Photobiol. A 162 (2004) 423–430.
- [22]. X. Fu, L.A. Clark, Q. Yang, M.A. Anderson, Environ. Sci. Technol. 30 (1996) 647–653.

- [23]. X. Fu, L.A. Clark, W.A. Zeltner, M.A. Anderson, *J. Photochem. Photobiol. A* 97 (1996) 181–186.
- [24]. S. Yesodharan, E. Yesodharan, M. Gratzel, *Sol. Energy Mater. Sol. Energy Mater.* 10 (1984) 287–293.
- [25]. E. Yesodharan, M. Gratzel, *Helv. Chim. Acta* 76 (1983) 2145–2156.
- [26]. M.E. Calvo, R.J. Candal, S.A. Bilmes, *Environ. Sci. Technol.* 35 (2001) 4132–4138.
- [27]. M.E. Zorn, D.T. Tompkins, W.A. Zeltner, M.A. Anderson, *Environ. Sci. Technol.* 34 (2000) 5206–5210.
- [28]. A. Tapalov, D. Molnar-Gabor, J. Csanadi, *Water Res.* 33 (1999) 1371–1376.
- [29]. R. Doong, W. Chang, *J. Photochem. Photobiol. A* 107 (1997) 239–244.
- [30]. J.C. D’Oliveira, G. Al-Sayyed, P. Pichat, *Environ. Sci. Technol.* 24 (1990) 990–996.
- [31]. N. Peill, M.R. Hoffmann, *Environ. Sci. Technol.* 30 (1996) 2806–2812.
- [32]. R.W. Matthews, S.R. McEvoy, *J. Photochem. Photobiol. A* 64 (1992) 231–246.
- [33]. M. Bideau, B. Claudel, C. Dubien, L. Faure, H. Kazouan, *J. Photochem. Photobiol. A* 91 (1995) 137–144.
- [34]. R.J. Brandi, O.M. Alfanso, A.E. Cassano, *Environ. Sci. Technol.* 34 (2000) 2623–2639.
- [35]. D.D. Dionysiou, A.P. Khodadoust, A.M. Kern, M.T. Suidan, I. Baudin, J.M. Laine, *Appl. Catal. B* 24 (2000) 139–155.
- [36]. W.F. Jardim, S.G. Moraes, M.M.K. Takiyama, *Water Res.* 31 (1997) 1728–1732.
- [37]. K.T. Ranjit, B. Viswanathan, *J. Photochem. Photobiol. A* 108 (1997) 79–84.
- [38]. C.S. Turchi, D.F. Ollis, *J. Catal.* 119 (1989) 483–496.
- [39]. I.K. Konstantinou, T.M. Sakellarides, V.A. Sakkas, T.A. Albanis, *Environ. Sci. Technol.* 35 (2001) 398–405.
- [40]. J.J. Pignatello, Y. Sun, *Water Res.* 29 (1995) 1837–1844.
- [41]. L. Muzkat, L. Bir, J. Feigelson, *J. Photochem. Photobiol. A* 87 (1995) 85–88.
- [42]. Y. Ku, I.-L. Jung, *Chemosphere* 37 (1998) 2589–2597.
- [43]. E.A. Kozlova, P.G. Smirniotis, A.V. Vorontsov, *J. Photochem. Photobiol. A* 162 (2004) 503–511.