

## References

- Allen, N. S.; Edge, M.; He, J. H. And Thompson, F. 1992. "Electrophotographic and microwave photodielectric studies (I) Effect of various transition metal dopants on Titanium dioxide Pigments in the solid state", *Dyes and Pigments*. 20(1992), 211-226.
- Anderson, C. and Bard, A. J. 1995. "An improved photocatalyst of TiO<sub>2</sub>/ SiO<sub>2</sub> prepared by a sol-gel synthesis", *J. Phys. Chem.*, 99(1995), 9882-9885.
- Arana, J.; Diaz, O. G.; Saracho, M. M.; Dona Rodriguez, J. M.; Herrera Melian, J. A. And Pena, J. P. 2002. "Maleic acid photocatalytic degradation using Fe-TiO<sub>2</sub> catalysts: Dependence of the degradation mechanism on the Fe catalysts content", *Applied Catalysis B: Environmental*. 36(2002), 113-124.
- Arroyo, R.; Cordoba, G.; Padilla, J. and Lara, V. H. 2002. "Influence of manganese ions on the anatase-rutile phase transition of TiO<sub>2</sub> prepared by the sol-gel process", *Materials Letters*. 54 (2002), 397-402.
- Abe, R.; Sayama, K. And Arakawa, H. 2003. "Significant effect of iodide addition on water splitting into H<sub>2</sub> and O<sub>2</sub> over Pt-loaded TiO<sub>2</sub> photocatalyst: suppression of backward reaction", *Chemical Physics Letters*. 371(2003), 360-364.
- Arabazis, I. M.; Stergiopoulos, T.; Andreeva, D.; Kitova, S.; Neophytides, S. G. and Falaras, P. 2003. "Characterization and photocatalytic activity of Au/TiO<sub>2</sub> thin films for azo-dye degradation", *Journal of Catalysis*. 220(2003), 127-135.
- Bregani, F.; Casale, C.; Depero, L. E.; Natali-Sora, I.; Robba, D.; Sangaletti, L. and Teledo, G. P. 1996. "Temperature effects on the size of anatase crystallites in Mo-TiO<sub>2</sub> and W-TiO<sub>2</sub> powders", *Sensors and Actuators B*. 31(1996), 25-28.

- Brezova, V.; Blazkova, A.; Karpinsky, L.; Groskova, J.; Havlinova, B.; Jorik, V. and Ceppan, M. 1997. "Phenol decomposition using  $M^{n+}/TiO_2$  photocatalysts supported by the sol-gel technique on glass fibres", Journal of Photochemistry and Photobiology A: Chemistry. 109 (1997), 177-183.
- Balong, Z.; Baishun, C.; Keyu, S.; Shangjin, H.; Xiaodong, L.; Zongjie, D. and Kelian, Y. 2003. "Preparation and characterization of nanocrystal grain  $TiO_2$  porous microspheres", Applied Catalysis B: Environmental. 40(2003), 253-258.
- Burns, A.; Hayes, G.; Li, W.; Hirvonen, J.; Derek Demaree, J. and Ismart Shah, S. 2004. "Neodymium ion dopant effects on the phase transformation in sol-gel derived titania nanostructures", Materials Science and Engineering B. 111(2004), 150-155.
- Brunauer, S.; Deming, L. S.; Deming, W. E. and Teller, E. 1940. "On a Theory of the Van Der Waals adsorption of gases", Journal of American Chemical Society. 62(1940), 1723-1732.
- Buchner, W.; Schliebs, S.; Winter, G. and Buchel. K. H. 1989. Industrial Inorganic Chemistry. New York : VCH.
- Clark, R. J. H. 1968. The Chemistry of Titanium and Vanadium. Amsterdam : Elsevier.
- Chemat. 1998. Sol-Gel Technology. <http://www.chemat.com/html/solgel.html>. Chemat Technology, Inc.
- Chang Song, K. and Pratsinis, S. E. 2000. "The effect of alcohol solvents on the porosity and phase composition of titania", Journal of Colloid and Interface Science. 231(2000), 289-298.
- Chiang, K.; Amal, R. and Tran, T. 2002. "Photocatalytic degradation of cyanide using titanium dioxide modified with copper oxide", Advances in Environmental Research. 6(2002), 471-485.

- Coronado, J. M.; Maira, A. J.; Martinez-Arias, A.; Conesa, J. C. and Soria, J. 2002. "EPR study of the radicals formed upon UV irradiation of ceria-based photocatalysts", Journal of Photochemistry and Photobiology A: Chemistry. 150(2002), 213-221.
- Cun, W.; Jincai, Z.; Ximming, W.; Bixian, M.; Guoying, S.; Ping' an, P. and Jiamo, F. 2002. "Preparation, characterization and photocatalytic activity of nano-sized ZnO/SnO<sub>2</sub> coupled photocatalysts", Applied Catalysis B: Environmental. 39(2002), 269-279.
- Carneiro, P. A.; Osugi, M. E.; Sene, J. J.; Anderson, M. A. and Boldrin Zanoni, M. V. 2004. "Evaluation of color removal and degradation of a reactive textile azo dye on nanoporous TiO<sub>2</sub> thin-film electrodes", Electrochimica Acta. 49(2004), 3807-3820.
- Ding, Z.; Lu, G. Q. and Greenfield, P. F. 2000. "Role of the crystallite phase of TiO<sub>2</sub> in heterogeneous photocatalysis for phenol oxidation in water", Journal of Physical Chemistry. 104(2000), 4815-4820.
- Di Paola, A.; Marci, G.; Palmisano, L.; Schiavello, M.; Uosaki, K.; Ikeda, S. and Ohtani, B. 2002. "Preparation of polycrystalline TiO<sub>2</sub> photocatalysts impregnated with various transition metal ions: Characterization and photocatalytic activity for the degradation of 4-Nitrophenol", J. Phys. Chem.. 106(2002), 637-645.
- Eskelinen, P. 1993. "Effect of SiO<sub>2</sub>, NaCl, Al<sub>2</sub>O<sub>3</sub>, and FeCl<sub>3</sub> on the phase change behavior of supported and unsupported TiO<sub>2</sub>", Journal of Solid State Chemistry. 106(1993), 213-218.
- Escobar, J.; Reyes, J. D. and Viveros, T. 2000. "Influence of the synthesis additive on the texture and structural characteristic of Sol-Gel Al<sub>2</sub>O<sub>3</sub>-TiO<sub>2</sub>", Industrial and Engineering Chemistry Research. 39(2000), 666-672.

- Gomes de Moraes, S.; Sanches Freire, R. and Duran, N. 2000. "Degradation and toxicity reduction of textile effluent by combined photocatalytic and ozonation processes", Chemosphere. 40 (2000), 369-373.
- Haddow, D. B.; Kothari, S.; James, P. F.; Short, R. D.; Hatton, P.V. and van Noort, R. 1996. "Synthetic implant surfaces: 1. The formation and characterization of sol-gel titania films", Biomaterials. 17(1996), 501-507.
- Herrmann, J. -M.; Tahiri, H.; Ait-Ichou, Y.; Lassaletta, G.; Gonzalez-Elipe, A. R. and Fernanedz, A. 1997. "Characterization and photocatalytic activity in aqueous medium of TiO<sub>2</sub> and Ag-TiO<sub>2</sub> coatings on quartz", Applied Catalysis B: Environmental. 13(1997), 219-228.
- Harizanov, O.; Ivanova, T. and Harixanova, A. 2001. "Study of sol-gel TiO<sub>2</sub> and TiO<sub>2</sub>-MnO obtained from a peptized solution", Materials Letters. 49(2001), 165-171.
- Houas, A.; Lachheb, H.; Ksibi, M.; Elaloui, E.; Guillard, C. and Hermann, J. -M. 2001. "Photocatalytic degradation pathway of methylene blue in water", Applied Catalysis B: Environmental. 31(2001), 145-157.
- Kiriakidou, F.; Kondarides, D.I. and Verykios, X. E. 1999. "The effect of operational parameters and TiO<sub>2</sub>-doping on the photocatalytic degradation of azo-dyes", Catalysis Today. 54(1999), 119-130.
- Kumar, S. R.; Suresh, C.; Vasudevan, A. K.; Suja, N. R. and Mukundan, P. 1999. "Phase transformation in sol-gel titania containing silica", Materials Letters. 38(1999), 161-166.
- Khalil, T.; Abou El-Nour, F.; El-Gammal, B and Boccaccini. 2001. "Determination of surface area and porosity of sol-gel derived ceramic powders in the system TiO<sub>2</sub>-SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>", Powder Technology. 114(2001), 106-111.

- Klosek, S. and Raftery, D. 2001. "Visible light driven V-doped TiO<sub>2</sub> photocatalyst and its photooxidation of ethanol", *J. Phys. Chem.* 105(2001), 2815-2819.
- Karvinen, S. 2003. "The effects of trace elements on the crystal properties of TiO<sub>2</sub>", *Solid State Sciences*. 5(2003), 811-819.
- Liqiang, J.; Xiaojun, S.; Weimin, C.; Zili, X.; Yaoguo, D. and Honggang, F. 2003. "The preparation and characterization of nanoparticle of TiO<sub>2</sub>/Ti films and their photocatalytic activity", *Journal of Physics and Chemistry of Solids*. 64(2003), 615-623.
- Lee, J. E.; Oh, S.-M. and Park, D. -W. 2004. "Synthesis of nano-sized Al doped TiO<sub>2</sub> powders using thermal plasma", *Thin Solid Films*. 457(2004), 230-234.
- Liqiang, J.; Xiaojun, S.; Baifu, X.; Baiqi, W.; Weimin, C. and Honggang, F. 2004. "The preparation and characterization of La doped TiO<sub>2</sub> nanoparticles and their photocatalytic activity", *Journal of Solid State Chemistry*. 177(2004), 3375-3382.
- Li, G.; Li, L.; Boerio-Goates, J. and Woodfield, B. F. 2005. "High purity anatase TiO<sub>2</sub> nanocrystals: Near room-temperature synthesis, grain growth kinetics, and surface hydration chemistry", *J. AM. Chem. Soc.*. xxxx(2005)xxx-xxx. (Articles in press).
- Marci, G.; Palmisano, L.; Sclafani, A.; Venezia, A. M.; Campostrini, R.; Carturan, G.; Martin, C.; Rives, V. and Solana, G. 1996. "Influence of tungsten oxide on structural and surface properties of sol-gel prepared TiO<sub>2</sub> employed for 4-nitrophenol photodegradation", *J. Chem. Soc., Faraday Trans.*. 92(5)(1996), 819-829.
- Mills, A. and Wang, J. 1999. "Photobleaching of methylene blue sensitised by TiO<sub>2</sub>: an ambiguous system? ", *Journal of Photochemistry and Photobiology A: Chemistry*. 127(1999), 123-134.

- Murata, Y.; Fukuta, S.; Ishikawa, S. and Yokoyama, S. 2000. "Photoelectrochemical properties of  $\text{TiO}_2$  rutile microalloyed with ad and 5d transition elements", Solar Energy Materials&Solar Cells. 62(2000), 157-165.
- Matsuo, S.; Sakaguchi, N.; Yamada, K.; Matsuo, T. and Wakita, H. 2004. "Role in photocatalysis and coordination structure of metal ions adsorbed on titanium dioxide particles: a comparison between lanthanide and iron ions", Applied Surface Science. 228(2004), 233-244.
- Navio, J. A.; Colon, G., Litter, M. and Bianco, G. N. 1996. "Synthesis, characterization and photocatalytic properties of iron-doped titania semiconductors prepared from  $\text{TiO}_2$  and iron (III) acetylacetone", Journal of Molecular Catalysis A: Chemical. 106(1996), 267-276.
- Ohno, T.; Tanigawa, F.; Fujihara, K.; Izumi, S. and Matsumura, M. 1999. "Photocatalytic oxidation of water by visible light using ruthenium-doped titanium dioxide powder", Journal of Photochemistry and Photobiology A: Chemistry. 127(1999), 107-110.
- O'Sheam K. E.; Pernas, E. and Saiers, J. 1999. "The Influence of mineralization products on the coagulation of  $\text{TiO}_2$  photocatalyst", Langmuir. 15(1999), 2071-2076.
- Ohtani, B.; Ogawa, Y.; Nishimoto, S. -I. 1997. "Photocatalytic activity of amorphous-anatase mixture of titanium(IV) oxide particles suspended in aqueous solutions", J. Phys. Chem. B. 101(30 January 1997), 3746-3752.
- Ryu, Z.; Zheng, J.; Wang, M. and Zhang, B. 1999. "Characterization of pore size distributions on carbonaceous adsorbents by DFT", Carbon. 37(1999), 1257-1264.
- Ranjit, K. T.; Willner, I.; Bossmann, S. H. and Braun, A. M. 2001. "Lanthanide oxide doped titanium dioxide photocatalysts: Effective photocatalysts for the enhanced degradation of salicylic acid and *t*-cinnamic acid", Journal of Catalysis. 204(2001), 305-313.

- Reddy, K. M.; Reddy, R. C. V. and Manorama, S. V. 2001. "Preparation, characterization, and spectra studies on nanocrystalline anatase  $\text{TiO}_2$ ", Journal of Solid State Chemistry. 158 (2001), 180-186.
- Randorn, C.; Wongnawa, S. and Boonsin, P. 2004. "Bleaching of methylene blue by hydrated titanium dioxide", Science Asia. 30(2004), 149-156.
- Rao, K. V. S.; Lavedrine, B. and Boule, P. 2003. "Influence of metallic species on  $\text{TiO}_2$  for the photocatalytic degradation of dyes and dye intermediates", Journal of Photochemistry and Photobiology A: Chemistry. 154(2003), 189-193.
- Ruiz, A. M.; Cornet, A. and Morante, J. R. 2004. "Study of La and Cu influence on the growth inhibition and phase transformation of nano- $\text{TiO}_2$  used for gas sensors", Sensors and Actuators B. 100(2004), 256-260.
- Sanchez, E. and Lopez, T. 1995. "Effects of preparation method on the band gap of titania and platinum-titania sol-gel materials", Materials Letters. 25(1995), 271-275.
- Serpone, N.; Lawless, D. and Khairutdinov, R. 1995. "Size effects on the photophysical properties of colloidal anatase  $\text{TiO}_2$  particles: size quantization or direct transition in this Indirect semiconductor", Journal of Physical Chemistry. 99(1995), 16646-16654.
- Sanchez, E.; Lopez, T.; Gomez, R.; Morales, A. and Novaro, O. 1996. "Synthesis and characterization of sol-gel Pt/ $\text{TiO}_2$  catalyst", Journal of Solid State Chemistry. 122(1996), 309-314.
- So, W. W.; Park, S. B. and Moon, S. J. 1998. "Crystalline phase of titania particles prepared at room temperature by a sol-gel method", Journal of Materials Science Letters. 17(1998), 1219-1222.
- Suresh, C.; Biju, V.; Mukundan, P. and Warrier, K. G.K. 1998. "Anatase to rutile transformation in sol-gel titania by modification of precursor", Polyhedron. 17(1998), 3131-3135.

- Smyth, D. M. 2000. "The effect of dopants on the properties of metal oxides", Solid State Ionics. 129(2000), 5-12.
- Seo, D. K.; Lee, J. K. and Kim, H. 2001. "Synthesis of TiO<sub>2</sub> nanocrystalline powder by aging at low temperature", Journal of Crystal Growth. 233(2001), 298-302.
- Seo, D. K.; Lee, J. K.; Lee, E. G. and Kim, H. 2001. "Effect of aging on the formation of TiO<sub>2</sub> nanocrystalline powder", Materials Letters. 51(2001), 115-119.
- Shao, L.; Zhang, L.; Chen, M.; Lu, H. and Zhou, M. 2001. "Reactions of titanium oxides with water molecules. A matrix isolation FT-IR and density functional study", Chemical Physics Letters. 343(27 July 2001), 178-184.
- Samantary, S. M.; Mohapatra, P. and Parida, K. 2003. "Physico-chemical characterization and photocatalytic activity of nanosized SO<sub>4</sub><sup>2-</sup>/TiO<sub>2</sub> towards degradation of 4-nitrophenol", Journal of Molecular Catalysis A: Chemical. 198(2003), 277-287.
- Styliadi, M.; Kondarides, D. I. and Verykios, X. E. 2003. "Pathways of solar light-induced photocatalytic degradation of azo dyes in aqueous TiO<sub>2</sub> suspensions", Applied Catalysis B: Environmental. 40(2003), 271-286.
- Sung-Suh, H. M.; Choi, J. R.; Hah, H. J.; Koo, S. M. and Bac, Y. C. 2004. "Comparison of Ag deposition effects on the photocatalytic activity of nanoparticulate TiO<sub>2</sub> under UV light irradiation", Journal of Photochemistry and Photobiology A: Chemistry. 163(2004), 37-44.
- Tang, Z.; Zhang, J.; Cheng, Z. and Zhang, Z. 2002. "Synthesis of nanosized rutile TiO<sub>2</sub> powder at low temperature", Materials Chemistry and Physics. 9319(2002), 1-4.
- Tsuji, H.; Sugahara, H.; Gotoh, Y. and Ishikawa, J. 2003. "Improvement of photocatalytic efficiency of rutile titania by silver negative-ion implantation", Nuclear Instruments and Methods in Physics Research B. 206(2003), 249-253.

- Valasco, M. J.; Rubio, F.; Rubio, J. and Oteo, J. L. 1999. "DSC and FT-IR analysis of the drying process of titanium alkoxide derived precipitates", Thermochimica Acta. 326(1999), 91-97.
- Wang, Y.; Cheng, H.; Hao, Y.; Ma, J.; Li, W. and Cai, S. 1999. "Photoelectrochemical properties of metal-ion-doped TiO<sub>2</sub> nanocrystalline electrodes", Thin Solid Films. 349(1999), 120-125.
- Wilke, K. and Breuer, H. D. 1999. "The influence of transition metal doping on the physical and photocatalytic properties of titania", Journal of Photochemistry and Photobiology A: Chemistry. 121(1999), 49-53.
- Wang, Z. C.; Chen, J. F. and Hu, X. F. 2000. "Preparation of nanocrystalline TiO<sub>2</sub> powders at near room temperature from peroxy-polytitanic acid gel", Materials Letters. 43(2000), 87-90.
- Wu, J. C. -S. and Chen, C. -H. 2004. "A visible-light response vanadium-doped titania nanocatalyst by sol-gel method", Journal of Photochemistry and Photobiology A: Chemistry. 163(2004), 509-515.
- Xu, N.; Shi, Z.; Fan, Y.; Dong, J.; Shi, J. and H U, M. Z. C. 1999. "Effects of particle size of TiO<sub>2</sub> on photocatalytic degradation of methylene blue in aqueous suspension", Industry and Engineering Chemistry Research. 38(1999), 373-379.
- Xie, H.; Zhang, Q.; Xi, T.; Wang, J. and Liu, Y. 2002. "Thermal analysis on nanosized TiO<sub>2</sub> prepared by hydrolysis", Thermochimica Acta. 381(2002), 45-48.
- Xie, Y. and Yuan, C. 2003. "Visible-light responsive cerium ion modified titania sol and nanocrystallites for X-3B dye photodegradation", Applied Catalysis B: Environmental. 46 (2003), 251-259.
- Xie, Y. and Yuan, C. 2004. "Characterization and photocatalysis of Eu<sup>3+</sup>-TiO<sub>2</sub> sol in the hydrosol reaction system", Materials Research Bulletin. 39(2004), 533-543.

- Xu, J. -C.; Shi, Y. -L.; Huang, J. -E.; Wang, B. and Li, H. -L. 2004. "Doping metal ions only onto the catalyst surface", Journal of Molecular Catalysis A: Chemical. 219(2004), 351-355.
- Yang, J. and Ferreira, J. M. F. 1998. "Inhibitory effect of the  $\text{Al}_2\text{O}_3$ - $\text{SiO}_2$  mixed additives on the anatase-rutile phase transformation", Materials Letters. 36(1998), 320-324.
- Yanagisawa, K. and Ovenstone, J. 1999. "Crystallization of anatase from amorphous titania using the hydrothermal technique: Effects of starting material and temperature", Journal of Physical Chemistry B. 103(1999), 7781-7787.
- Yanqing, Z.; Erwel, S.; Zhinzhana, C.; Wenjun, L. and Xingfang, H. 2001. "Influence of solution concentration on the hydrothermal preparation of titania crystallines", Journal of Material Chemistry. 11(2001), 1547-1551.
- Yamashita, H.; Harada, M.; Misaka, J.; Takeuchi, M.; Ikeue, K. and Anpo, M. 2002. "Degradation of propanol diluted in water under visible light irradiation using metal ion-implanted titanium dioxide photocatalyst", Journal of Photochemistry and Photobiology A: Chemistry. 148 (2002), 257-261.
- Yang, P.; Lu, C.; Hua, N. and Du, Y. 2002. "Titanium dioxide nanoparticles co-doped with  $\text{Fe}^{3+}$  and  $\text{Eu}^{3+}$  ions for photocatalysis", Materials Letters. 57(2002), 794-801.
- Yang, S.; Liu, Y.; Guo, Y.; Zhao, J.; Xu, H. and Wang, Z. 2002. "Preparation of rutile titania nanocrystals by liquid method at room temperature", Materials Chemistry and Physics. 9430 (2002), 1-6.
- Yu, J.; Yu, J. C.; Leung, M. K. P.; Ho, W.; Cheng, B.; Zhao, X. and Xhao, J. 2003. "Effects of acidic and basic hydrolysis catalysts on the photocatalytic activity and microstructures of bimodal mesoporous titania", Journal of Catalysis. 217(2003), 69-78.

- Yu, J. G. Y.; Yu, J. C.; Cheng, B.; Hark, S. K. and Iu, K. 2003. "The effect of F- doping and temperature on the structural and textural evolution of mesoporous TiO<sub>2</sub> powders", Journal of Solid State Chemistry. 174(2003), 372-380.
- Zhang, Q.; Gao, L. and Guo, J. 2000. "Effects of hydrolysis conditions on morphology and crystallization of nanosized TiO<sub>2</sub> powders", Journal of the European Ceramic Society. 20 (2000), 2153-2158.
- Zhu, Y.; Zhang, L.; Yao, W. and Cao, L. 2000. "The chemical states and properties of doped TiO<sub>2</sub> film photocatalyst prepared using the sol-gel method with TiCl<sub>4</sub> as a precursor", Applied Surface Science. 158(2000), 32-37.
- Zhang, R. and Gao, L. 2001. "Effect of peptization on phase transformation of TiO<sub>2</sub> nanoparticles", Materials Research Bulletin. 36(2001), 1957-1965.
- Zhang, Y. H. and Reller, A. 2001. "Nanocrystallite iron-doped mesoporous titania and its phase transition", Journal of Materials Chemistry. 11(2001), 2537-2541.
- Zhang, Y. -H. and Reller, A. 2002. "Phase transformation and grain growth of doped nanosized titania", Materials Science and Engineering C. 19(2002), 323-326.
- Zhang, X.; Sutanto, I.; Taketo, Taguchi, T.; Tokuhiro, K.; Meng, Q.; Rao, T. N.; Fujishima, A.; Watanabe, H.; Nakamori, T. and Uragami, M. 2003. "Al<sub>2</sub>O<sub>3</sub>-coated nanoporous TiO<sub>2</sub> electrode for solid-state dye-sensitized solar cell", Solar Energy Materials&Solar Cells. 80 (2003), 315-326.
- Zhang, Y.; Xu, H.; Xu, Y.; Zhang, H. and Wang, Y. 2004. "The effect of lanthanide on the degradation of RB in nanocrystalline Ln/TiO<sub>2</sub> aqueous solution", Journal of Photochemistry and Photobiology A: Chemistry. 170(2004), 279-285.