

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
26 May 2006 (26.05.2006)

PCT

(10) International Publication Number
WO 2006/054954 A1

(51) International Patent Classification:

B01J 21/06 (2006.01) **B01J 23/06** (2006.01)
B01J 19/12 (2006.01) **C02F 1/30** (2006.01)
B01J 19/24 (2006.01)

(74) Agent: **ELLA CHEONG SPRUSON & FERGUSON**
(SINGAPORE) PTE LTD; P.O. Box 1531, Robinson
Road Post Office, Singapore 903031 (SG).

(21) International Application Number:

PCT/SG2005/000400

(22) International Filing Date:

22 November 2005 (22.11.2005)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

200406822-7 22 November 2004 (22.11.2004) SG

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (for all designated States except US): **WATER AND ENVIRONMENTAL TECHNOLOGIES PTE. LTD** [SG/SG]; 167 Jalan Bukit Merah, #01-10, Singapore 150167 (SG).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **TANG, Tsen Meng** [SG/SG]; Blk 105, Spottiswoode Park Road, #16-126, Singapore 080105 (SG). **TAN, Hsing Loong** [SG/SG]; Kim-sia Court, Blk 19, Jalan Jintan, Singapore 229012 (SG). **WANG, Danmei** [SG/SG]; 69A Nanyang View, Singapore 639653 (SG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: FABRICATION OF A DENSELY PACKED NANO-STRUCTURED PHOTOCATALYST FOR ENVIRONMENTAL APPLICATIONS

(57) Abstract: The invention relates to the purification of a fluid medium, for example air or water, and more particularly to the adsorption and/or degradation of organic pollutants in water and also to accelerate total organic carbon (TOC) reduction, chlorine destruction and ozone destruction. The invention describes a novel photocatalyst which comprises a layered nano-structured semiconductor doped with a material selected from the group consisting of a metal, a metal alloy, a metal oxide and mixtures thereof, said material being located between the layers of semiconductor, and the layered nano-structured semiconductor being attached to a substrate which may be easily removed from the fluid medium. The novel photocatalyst may be used together with a light source with a wavelength that will activate the photocatalyst for purification of fluids by adsorption and/or degradation of pollutants. An object of the present invention is to apply this invention to a practical fluid purification system for either commercial or domestic use, or by improving existing systems, for example for the purification of potable water or for treating water from natural sources such as reservoirs, streams, groundwater or even wastewater for reuse.

WO 2006/054954 A1