BIT's 4th Annual World Congress of Smart Materials-2018 Osaka, Japan

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Your Think Tank

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Smart Materials

BIT's 4th Annual World Congress of

Smart Materials-2018

Time: March 6–8, 2018
Venue: Hyatt Regency Osaka, Japan

会刊 Conference Guide

BIT's 7th Annual World Congress of Advanced Materials-2018

Theme: Innovation, Integration, Transformation and Sustainability

Time: September 13-15, 2018 Place: Xiamen, China

Highlights of WCAM-2018

- 500+ Bright Minds Give Talks on the Hot Topics in Advanced Materials
- 50+ Exhibitors Showcasing the Emerging New Products and Technologies to an Audience of over 1000 People
- 3 Days of Conference and Networking (1000 Ddelegates | 500 Speakers | 40 Countries)
- Cutting-edge Keynote Addresses by Prominent Leaders from All over the World
- Disseminate Your Project, Present Your Activities and Meet Partners for Future Collaboration at the WCAM-2018
- Opportunities to Visit Chinese Natural and Cultural Landscapes

Program at Glance

Theme 1: Ceremony of Conference

Part 1: Opening Ceremony
Part 2: Keynote Forum
Part 3: Master's Dialog
Part 4: Industrial Policy, Measures and Development Trends on Advanced Materials

Theme 2: Scientific Program

Section 1: Frontier Trends of Advanced Materials
Section 2: Advanced Structural Materials
Section 3: Functional Materials
Section 4: Next Gernation Information Technology and Materials
Section 5: Smart Electronic Materials
Section 6: Novel Nanomaterials
Section 7: Materials for Energy and Environment
Section 8: Fundamental Science of Advanced Materials
Section 9: Advanced Materials Processing and Manufacturing

Theme 3: Industrial Symposia

Theme 4: Business & Career Development

Theme 5: Young Investigator Forum

Theme 6: Poster and Exhibition

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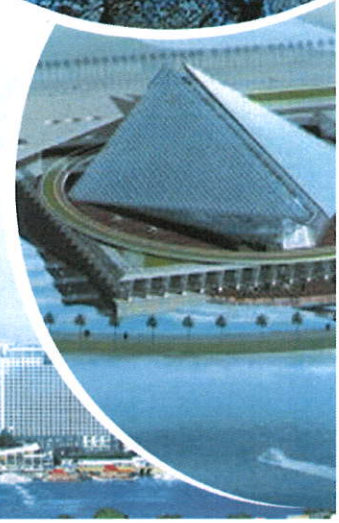

Papers and Posters

Title: Antimicrobial Effect of a Novel Photosemiconductor Composed of Ag Nanoplate, Boron and Clay, and Its Increase by Visible Light Irradiation

Dr. Kenji Tanaka, Kojiro Yamamoto, Seiichiro Tsujituka, and Kengo Itou*
Professor
Kindai University
Japan

Abstract

We developed a novel photosemiconductor material which is a complex of Ag nanoplate, boron, and clay. It produces current when exposed to UV, visible light or near infrared light. This material, which is called ABC photoconductor, finely disperses in organic solvent and is relatively transparent. Therefore, ABC photosemiconductor can be easily used like paint on surface of industrial products. Further, we expect other functions like photocatalyst. We investigated the antimicrobial effect of ABC photosemiconductor in the dark place and the increase in antimicrobial activity by irradiation of visible light.
Antimicrobial activity was measured by modifying Japanese Industrial Standard (JIS) R1752. ABC photosemiconductor dispersion was diluted with organic solvent then 100μl of the thin dispersion was spread over a PET film (5x5cm) coated with adsorbent, then the film was dried at room temperature for immobilization. Suspension of bacterial cells or fungal spores (100μl) was applied on the test film then it was covered with a plain PET film (4x4cm). The test piece was incubated at 25°C (for bacteria) or 30°C (for fungi) for 8 hours in the dark (less than 0.1 lx) or under visible light (1000 lx) from white LED.
Survival rate of bacteria ($6.7*10^5$*$2.6*10^6$ cells/ml of *E.coli*) on the film immobilized with $0.16\mu g/cm^2$ of ABC photosemiconductor decreased to 0.1% even in the dark compared to that on the plain PET film as the control. Irradiation of visible light further increased the antibacterial activity and *E.coli* cells were completely sterilized. Antibacterial activity was still observed even decreasing the photosemiconductor on the test film to $0.016\mu g/cm^2$. *Staphylococcus aureus* and *Pseudomonas aeruginosa* were also inhibited severely under visible light. By increasing the photosemiconductor on the test film, fungal spores (*Aspergillus niger*, *Penicillum pinophilum* and *Trichoderma virens*) were remarkably deminished. The complexes containing no boron or clay did not inhibit the microorganisms, which may indicate the antimicrobial effect of ABC photosemiconductor is not due to the toxicity of Ag but photoconductive electric action.

Biography

Dr. Kenji Tanaka (Ph.D.-Agriculture) now is a Professor of Department of Biological and Environmental Chemistry, School of Humanity-Oriented Science & Engineering, Kindai University, Japan. Specialist in applied microbiology, especially biosynthesis of biodegradable plastic from CO_2. He got Encouragement Award (1996) and Technical Award (2002) of the Society for Biotechnology, Japan