



Takeshi YAMAUCHI, Ph.D.

Professor

Program: Advanced Materials Science and Technology

Area: Materials Science and Technology

Undergraduate: Dept. of Engineering

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Professional Expertise

His professional expertise encompasses biomimetic sensors and actuators using polymer. He and his group are studying biomimetic engineering on preparation of novel materials for the new age. Their concept is that analyzing functions of bio-polymers, cells, tissues, organs, and organisms in biological hierarchy, respectively and inspiring them into conductive soft materials for producing high-grade sensors and actuators.

Material design utilizing bio-pattern in nature

He is focusing on the preparation of novel soft materials utilizing bio-pattern in nature. The smart soft material, which response external stimulus such as temperature, pH, solvent, and electric field, has developed for using high grade artificial muscle, biomimetic actuators, intelligent touch sensors, which has micro-pattern in nature.

Material design utilizing self organization of micro-materials

He is focusing on the preparation of smart micro-hybrid materials utilizing self organization of micro-materials. Self organized soft material has high grade biomimetic sensors and actuators which composed with nano-materials such as carbon nanotube, fullerene, and DNA.

Material design utilizing revolutionary problem solution method

He is focusing on the preparation of hybrid materials utilizing revolutionary problem solution method such as TRIZ which is expected to transfer bio-technology into engineering patents.

Education

1994: Ph.D. in Agriculture Sci., University of Tsukuba, Japan

1991: Master Sci. degree, Graduate School, Ibaraki University, Japan

1989: Bachelor Sci. degree, Graduated from Dept. of Chemistry, Ibaraki University, Japan

Major Publications

Papers

- [1] Preparation of composite materials of polypyrrole and electroactive polymer gel using for actuating system, T. Yamauchi, S. Tansuriyavong, K. Doi, K. Oshima, M. Shimomura, N. Tsubokawa, S. Miyauchi, and J. F. V. Vincent, *Synthetic Metals*, 152, 45-48 (2005).
- [2] Preparation and properties of biocompatible polymer-grafted silica nanoparticle, R. Yokoyama, S. Suzuki, K. Shirai, T. Yamauchi, N. Tsubokawa, *Eur. Polymer Journal*, 42, 3221-3229 (2006).
- [3] Novel Contamination and gas Sensor Materials from Amphiphilic Polymer-Grafted Carbon Black, H. Morohashi, T. Nakayama, H. Iwata, T. Yamauchi, N. Tsubokawa, 38, 6, 548-553 (2007).
- [4] Fine-tuning in size and surface morphology of rod-shaped polypyrrole using porous silicon as template, K. Fukami, F. A. Harraz, T. Yamauchi, T. Sakka, Y. Ogata, *Electrochemistry Communications*, 10, 1, 56-60 (2008).
- [5] Preparation and electromagnetic wave-sensitivity of poly(N-isopropylacrylamide) gels containing polymer-grafted carbon microcoils, T. Yamauchi, S. Sato, S. Obara, N.

Tsubokawa, et al., Journal of network Polymer, Japan, 30, 3, 149-155 (2009).

[6] Preparation and properties of smart nano-materials from thermo-sensitive polymer grafted carbon nanotubes, T. Yamauchi, M. Ando, H. Sato, and N. Tsubokawa, the Electrochemical Society Transaction, 16, 47, 13-16 (2009)

[7] Evaluation of the stimulus response of

hydroxyapatite/calcium alginate composite gels, S.Obara, T. Yamauchi, N. Tsubokawa, Polymer Journal, 42(1) 1-6 (2010)

[8] Preparation of stimulus-sensitive gel particles with a DNA-dye complex and their pH sensitivity, polymer Journal, T.Nishiyama, T. Yamauchi, N. Tsubokawa, Polymer Journal, in press.

