



An automatic demulsification sponge for separation of oil/water emulsion

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Abstract:

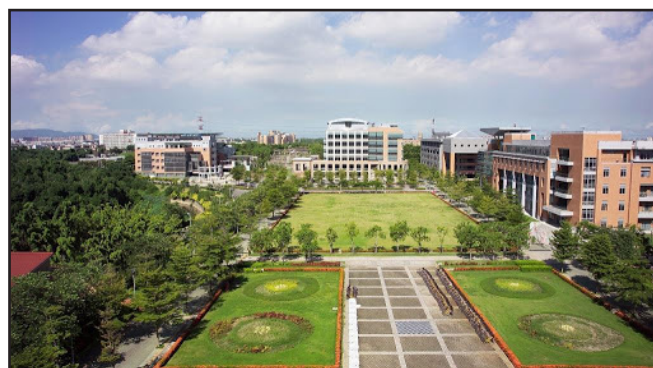
The oil droplets contained in wastewater often caused considerable troubles in wastewater treatment. Especially for the oil-water emulsions containing oil droplets with small particle size. The engineers and the researchers are always pursuing advanced materials and technology to deal with them.

Recently, a polymer with a quaternary amine structure was synthesized in our laboratory. We have applied such polymer to sterilization and separation of oil-water emulsions and achieved good results.

When such a monomer is specifically polymerized in sponges having particular pore structure, the emulsion-containing wastewater was separated perfectly (efficiency > 99%). Besides, these sponges exhibited a surprising automatic demulsification effect in just a few minutes. The application of the basic principles of electrostatic adsorption, concentration diffusion, aggregation, and density convection are used to explain the mechanism of the automatic demulsification effect. We believed that the discovery of this phenomenon will help the academic and engineering communities to develop more efficient automatic demulsification sponges in the near future.

Biography:

Dr. Ping-Szu Tsai currently is a Professor of the Department of Chemical and Materials Engineering. He received his B.S. degree in chemical engineering from National Taiwan University of Science and Technology, Master degree in college of Pharmacy from Kaoshiung Medical University and Ph.D. degree in chemical engineering from National Cheng Kung University. Dr. Tsai joined National Kaohsiung University of Science and Technology in 1992. Dr. Tsai's current research interests



include oil/water separation technology, organic/inorganic Nano hybrids, regeneration bitumen, emulsified bitumen/diesel, transparent/super hydrophobic coating and synthesis of functional polymers.

Publication of speakers:

- 1 J.Y. Wu, C.W. Huang, P.S. Tsai, 2019. Preparation of poly[3-(methacryloylamino) propyl] trimethyl ammonium chloride coated mesh for oil-water separation. *Desalination and Water Treatment*, 158, 301-308.
2. Y. Guan, F. Cheng, Z. Pan, X. Xue, F. Wang, and X. Liu, 2019. Superwetting Polymeric Three Dimensional (3D) Porous Materials for Oil/Water Separation: A Review. *Polymers*, 11(5), 1-34.
- 3 H. Huang, Y. Li, L. Zhao, Y. Yu, J. Xu, X. Yin, S. Chen, J. Wu, H. Yue, H. Wang, L. Wang, 2019. A Facile Fabrication of Chitosan Modified PPS-Based Microfiber Membrane for Effective Antibacterial Activity and Oil-In-Water Emulsion Separation. *Cellulose*, 26(4), 2599-2611.

International Webinar on Advance Material & Nanotechnology; Zurich, Switzerland; June 22, 2020

Citation: Ping-Szu Tsai; An automatic demulsification sponge for separation of oil/water emulsion; *Advanced Material* 2020; June 22, 2020 ; Zurich, Switzerland