

# HENRY

Hydraulic Engineering Repository

Ein Service der Bundesanstalt für Wasserbau

---

Conference Paper, Published Version

**Chang, Tien-Chin; You, Sheng-Jie; Lee, Ying-Yu**  
**Feasibility of Combined UASB-MBR System in Treating PTA Wastewater and Polyimide Membrane for Biogas Purification**

Zur Verfügung gestellt in Kooperation mit/Provided in Cooperation with:  
**Kuratorium für Forschung im Küsteningenieurwesen (KFKI)**

---

Verfügbar unter/Available at: <https://hdl.handle.net/20.500.11970/108512>

Vorgeschlagene Zitierweise/Suggested citation:

Chang, Tien-Chin; You, Sheng-Jie; Lee, Ying-Yu (2016): Feasibility of Combined UASB-MBR System in Treating PTA Wastewater and Polyimide Membrane for Biogas Purification. In: Yu, Pao-Shan; Lo, Wie-Cheng (Hg.): ICHE 2016. Proceedings of the 12th International Conference on Hydroscience & Engineering, November 6-10, 2016, Tainan, Taiwan. Tainan: NCKU.

**Standardnutzungsbedingungen/Terms of Use:**

Die Dokumente in HENRY stehen unter der Creative Commons Lizenz CC BY 4.0, sofern keine abweichenden Nutzungsbedingungen getroffen wurden. Damit ist sowohl die kommerzielle Nutzung als auch das Teilen, die Weiterbearbeitung und Speicherung erlaubt. Das Verwenden und das Bearbeiten stehen unter der Bedingung der Namensnennung. Im Einzelfall kann eine restriktivere Lizenz gelten; dann gelten abweichend von den obigen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Documents in HENRY are made available under the Creative Commons License CC BY 4.0, if no other license is applicable. Under CC BY 4.0 commercial use and sharing, remixing, transforming, and building upon the material of the work is permitted. In some cases a different, more restrictive license may apply; if applicable the terms of the restrictive license will be binding.

Verwertungsrechte: Alle Rechte vorbehalten



## **Feasibility of Combined UASB-MBR System in Treating PTA Wastewater and Polyimide Membrane for Biogas Purification**

*Tien-Chin Chang<sup>1</sup>, Sheng-Jie You<sup>2</sup>, Ying-Yu Lee<sup>2</sup>*

1. Recycling oriented Environment Research Center, National Taipei University of Technology  
Taipei, Taiwan
2. Department of Bioenvironmental Engineering, Chung Yuan Christian University  
Chungli, Taiwan

### **ABSTRACT**

Anaerobic processes have become actively practiced for waste and wastewater treatment during the recent years because it can apply for high organic loading whereas the producing biogas can be recovered as a new energy source. This study prompted to look on the feasibility of a combined UASB and aerated MBR system for the treatment of Purified Terephthalic Acid (PTA) wastewater and the usage of Polyimide membranes for biogas separation. The results revealed that the combined system is robust and flexible in relation to the change in Hydraulic Retention Times (HRTs) and organic loading rates. The overall COD removal of 97% with the maximum loading rate of 20 g L<sup>-1</sup> per day was achieved at 12 h HRT. The biogas from the UASB reactor was mainly methane (> 62%). The separation between CO<sub>2</sub> and CH<sub>4</sub> was explored using different concentrations of dense polyimide (PIs) membranes and feed pressure. The results showed the PI-based membrane has high potential for CH<sub>4</sub> purification with high selectivity and permeability toward CO<sub>2</sub> than CH<sub>4</sub>. The expediency of the proposed treatment system and gas-separating module was seen and thus purified biomethane could be mustered continuously.