

# REMEDIATION LABORATORY

## Researchers:

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## Achievements:

1. Development of technology and system for printing wastewater treatment such as the system for treatment of off-set, flexography and screen printing wastewater and recovery of kerosene from contaminated-printing wastewater (Fig.).



Fig. The system for recovery of kerosene from contaminated printing wastewater

### 2. Petty Patent

- Petty Patent No. 1887 (2005), Wastewater containing color and/or heavy metals system and process to treatment of wastewater containing color and/or heavy metals. of coir pith as an adsorbent in a cylinder container for treatment of heavy metal from industrial factory, 2009.
  - Petty Patent No. 4003 (2008), Process for modified chitin by using sodiumhypochlorite. Petty Patent No. 4900 (2009), Process of preparation
  - Petty Patent No. 5434 (2010), Process for production of activated carbon from corncob.
1. To study on phytoremediation of wastewater/soil contaminated with heavy metals and organic substances by local Thai plants.

2. To study on phytoremediation of volatile organic compounds by local Thai plants and its mechanism.
3. To develop the adsorbents from agricultural wastes for treatment of wastewater containing heavy metals and organic substances/recovery of value metals.
4. To develop the adsorbents for removal of color from the food industry.
5. To create the efficiency of wastewater treatment system and transfer the technology to the industry.

## Research Areas:

1. Phytoremediation of wastewater/soil contaminated with heavy metals and organic substances/color by local Thai Plants and also study the relationship between plants and microorganisms.
2. Phytoremediation of volatile organic compounds by local Thai plants and its mechanism.
3. Development of adsorbents from agricultural wastes for treatment of wastewater contaminated with heavy metal and organic substances/color.
4. Development of adsorbents for removal of color from the food industry.

## Selected Publications:

Sriprapat, W. and Thiravetyan, P. (2010) Phytoremediation of diethylene glycol contaminated wastewater by *Echinodorus cordifolius*, International Journal of Phytoremediation, accepted (impact factor 2008 = 1.217).

Noonpui, S., Thiravetyan, P., Nakbanpote, W. and Netpradit, S. (2010) Color removal from water-based ink wastewater by bagasse fly ash, sawdust fly ash and activated carbon, Chemical Engineering Journal, 162, 503-508 (impact factor 2008 = 2.813).

Suksabye, P., Worasith, N., Thiravetyan, P., Nakajima, A. and Goodman, B. A. (2010) A reinvestigation of EXAFS and EPR spectroscopic measurements of chromium (VI) reduction by coir pith, Journal of Hazardous Materials, 180, 759-763 (impact factor 2008 = 2.975).

Saiyood, S., Vangnai, A. S., Thiravetyan, P. and Inthorn, D. (2010) Bisphenol A removal by the *Dracaena* plant and the role of plant-associating bacteria, J. of Hazardous Materials, 178, 777-785 (impact factor 2008 = 2.975).

Inthorn, D., Tipprasertsin, K., Thiravetyan, P. and Khan, E. (2010) Color removal from textile wastewater by using treated flute reed in a fixed bed column, J. of Environmental Science and Health Part A, 45, 637-644 (impact factor 2008 = 1.00).

- Simaratanamongkol, A., Thiravetyan, P. (2010) Decolorization of melanoidin by activated carbon obtained from bagasse bottom ash, *J of Food Engineering*, 96, 14-17 (impact factor 2008 = 2.081).
- Ewecharoen, A., Thiravetyan, P., Wendel, E. and Bertagnolli, H. (2009) Nickel adsorption by sodium polyacrylate-grafted activated carbon, *J. of Hazardous Materials*, 171, 335-339 (impact factor 2008 = 2.975).
- Nilratnisakorn, S., Thiravetyan, P. and Nakbanpote, W. (2009) A constructed wetland model for synthetic reactive dye wastewater treatment by narrow-leaved cattails (*Typha angustifolia* Linn.), *Water Science & Technology*, 1565-1574. ((impact factor 2008 = 1.005).
- Aworn, A., Thiravetyan, P. and Nakbanpote, W. (2009) Preparation of CO<sub>2</sub> activated carbon from corncob for monoethylene glycol adsorption, *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 333, 19-25 (impact factor 2008 = 1.926).
- Suksabye, P., Nakajima, A., Thiravetyan, P., Baba, Y. and Nakbanpote, W. (2009) Mechanism of Cr(V) adsorption by coir pith studied by ESR and adsorption kinetic, *J. of Hazardous Materials*, 161, 1103-1108. (impact factor 2008 = 2.975).
- Leechart, P., Nakbanpote, W. and Thiravetyan, P. (2009) Application of 'waste' wood shaving bottom ash for adsorption of azo reactive dye, *J. of Environmental Management*, Vol. 90, 912-920. (impact factor 2008 = 1.794).
- Suksabye, P., Thiravetyan, P., Nakbanpote, W. (2008) Column study of chromium (VI) adsorption from electroplating industry by coconut coir pith, *J. of Hazardous Materials*, Vol. 160, 56-62 (impact factor 2008= 2.975).
- Aworn, A., Thiravetyan, P. and Nakbanpote, W. (2008) Preparation and characteristics of agricultural waste activated carbon by physical activation having micro- and mesopores, *J. of Analytical and Applied Pyrolysis*, 82, 279-285. (impact factor 2008 = 1.911).
- Ewecharoen, A., Thiravetyan, P. and Nakbanpote, W. (2008) Comparison of nickel adsorption from electroplating rinse water by coir pith and modified coir pith, *Chemical Engineering Journal*, 137, 181-188. (impact factor 2008 =2.813).
- Nilratnisakorn, S., Thiravetyan, P. and Nakbanpote, W. (2007) Synthetic reactive dye wastewater treatment by Narrow-leaved cattails (*Typha angustifolia* Linn.): effects of dye, salinity and metals, *Science of the Total Environment*, 384, 67-76. (impact factor 2008 = 2.579).
- Nakbanpote, W., Goodman, B. A. and Thiravetyan, P. (2007) Copper adsorption on rice husk derived materials studied by EPR and FTIR, *Colloid and Surface A: Physicochemical and Engineering Aspects*, Vol. 304, 7-13. (impact factor 2008 =1.926).
- Dolphen, R., Sakkayawong, N., Thiravetyan, P. and Nakbanpote, W. (2007) Adsorption of synthetic reactive dye wastewater onto modified chitin, *J. of Hazardous Materials*, Vol. 145, 250-255. (impact factor 2008 =2.975).
- Suksabye, P., Thiravetyan, P., Nakbanpote, W. and Chayabutra, S. (2007) Chromium removal from electroplating wastewater by coir pith, *J. of Hazardous Materials*, Vol. 141, 637-644. (impact factor 2008 = 2.975).
- Aworn, A., Thiravetyan, P. and Nakbanpote, W. (2005) Recovery of gold from gold slag by wood shaving fly ash, *J. of Colloid and Interface Science*, Vol. 287, 394-400. (impact factor 2008 =2.443).
- Sakkayawong, N., Thiravetyan, P. and Nakbanpote, W. (2005) Adsorption mechanism of synthetic reactive dye wastewater by chitosan, *J. of Colloid and Interface Science*, Vol. 286, 36-42. (impact factor 2008 = 2.443).
- Netpradit, S., Thiravetyan, P., Nakbanpote, W., Rattanakajhonsakul, K., Tantarawong and S., Jantarangri, P. (2004) Waste metal hydroxide sludge as a new adsorbent, *Environmental Engineering Science*, Vol. 21, No. 5, 575-582. (impact factor 2008 = 1.039).
- Songkroah, C., Nakbanpote, W. and Thiravetyan, P. (2004) Recovery of silver-thiosulphate complexes by chitin, *Process Biochemistry*, Vol. 39, 1553-1559. (impact factor 2008 = 2.414).
- Inthorn, D., Singtho, S., Thiravetyan, P. and Khan, E. (2004) Decolorization of basic, direct and reactive dyes by pre-treated narrow-leaved cattail (*Typha angustifolia* Linn.), *Bioresource Technology*, Vol. 94, 299-306. (impact factor 2008 = 4.453).
- Netpradit, S., Thiravetyan, P. and Towprayoon, S. (2004) Adsorption of 3 azo reactive dyes by metal hydroxide sludge: Effect of temperature, pH and electrolytes *Journal of Colloid and Interface Science*, Vol. 270, No. 2, 255-261. (impact factor 2008 =2.443).
- Netpradit S., Thiravetyan, P. and Towprayoon, S. (2004) Evaluation of metal hydroxide sludge for reactive dye adsorption in a fixed-bed column system, *Water Research*, Vol. 38, No. 1, 71-78. (impact factor 2008 =3.587).
- Netpradit, S., Thiravetyan, P. and Towprayoon, S. (2003) Application of 'Waste' metal hydroxide sludge for adsorption of azo

reactive dyes, *Water Research*, Vol. 37, No. 4, 763-772.  
(impact factor 2008 = 3.587).

Nakbanpote, W., Thiravetyan, P., and Kalambaheti, C. (2002) Comparison of gold adsorption by *Chlorella vulgaris*, rice husk and activated carbon, *Minerals Engineering*, 15, 549-552. (impact factor 2008 = 1.022).

Nakbanpote, W., Thiravetyan, P. and Kalambaheti, C. (2000) Preconcentration of gold by rice husk ash, *Minerals Engineering*, Vol. 13, No. 4, 391-400. (impact factor 2008 = 1.022).

Wilawan, S., Thiravetyan, P. and Tanticharoen, M. (2000) A possible mechanism of Zn<sup>2+</sup> uptake by living cells of *Penicillium* sp., *Biotechnology Letters*, Vol. 22, No. 21, 1709-1712. (impact factor 2008 = 1.595)

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