2019「中技社科技獎學金」
2019 CTCI Foundation Science and Technology Scholarship
境外生生活助學金
Living Grant for International Graduate Students

國立交通大學
National Chiao Tung University

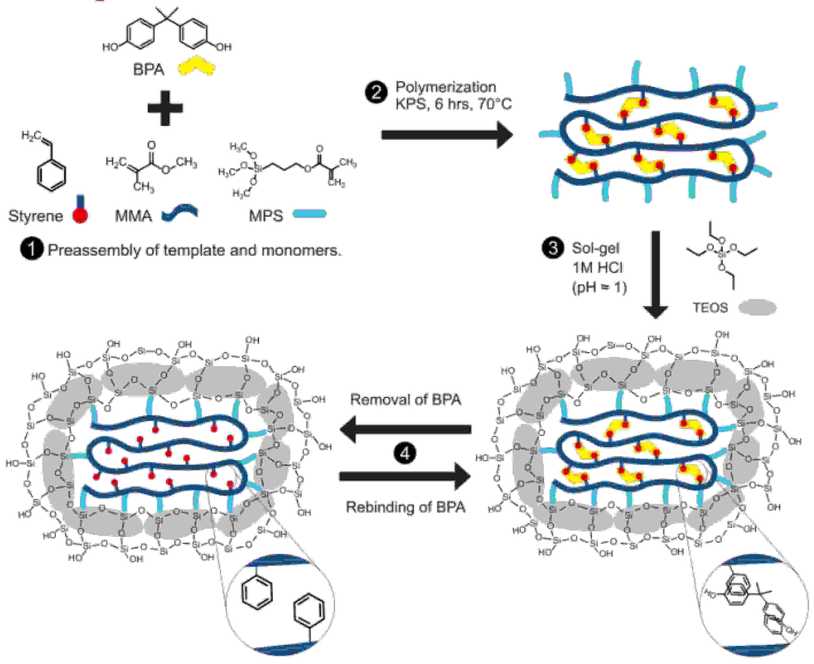
Molecularly Imprinted Organic-Inorganic Hybrid for Selective Adsorption of Bisphenol A

Kae-Zheng Chin[1] and Sue-min Chang[2]
Institute of Environmental Engineering, National Chiao Tung University, Hsinchu, Taiwan.
[1]PhD student; oswaldchin@gmail.com, [2]Advisor; chang@mail.nctu.edu.tw

INTRODUCTION

Bisphenol A (BPA) is known as endocrine disrupting chemicals (EDCs) which can produce adverse effects in humans and wildlife. High selectivity adsorbents are in great need to effectively remove/enrich BPA from our environments. Molecular imprinting is a nano-manipulating templating method which is used to synthesize recognition materials for specific target molecules. In this study, we take BPA molecules as the template molecule to prepare molecularly imprinted organic-inorganic hybrid (MIH), the BPA molecules were imprinted in copolymer and later was coated with SiO2, the designated hybrid nanostructure not only enhanced the adsorption affinity and facilitated mas transfer, but also effectively suppress the non-specific interactions.

Preparation of MIH



Roles of Organic and Inorganic in MIH

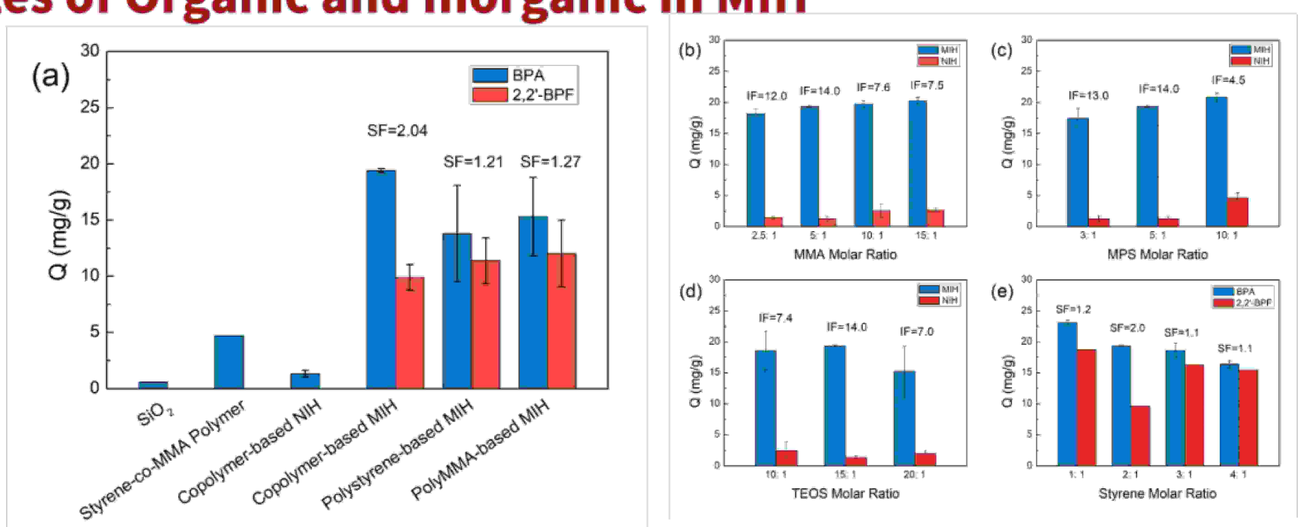


Figure 1. (a) Adsorption ability of different adsorbents on BPA. Adsorption ability of MIH and NIH on BPA prepared with different (b) MMA/BPA molar ratios, (c) MPS/BPA molar ratios, (d) TEOS/BPA molar ratios, and (e) recognition ability of MIH on BPA and 2,2'-BPF prepared by different styrene/BPA molar ratios.

Adsorption Behaviours of MIH

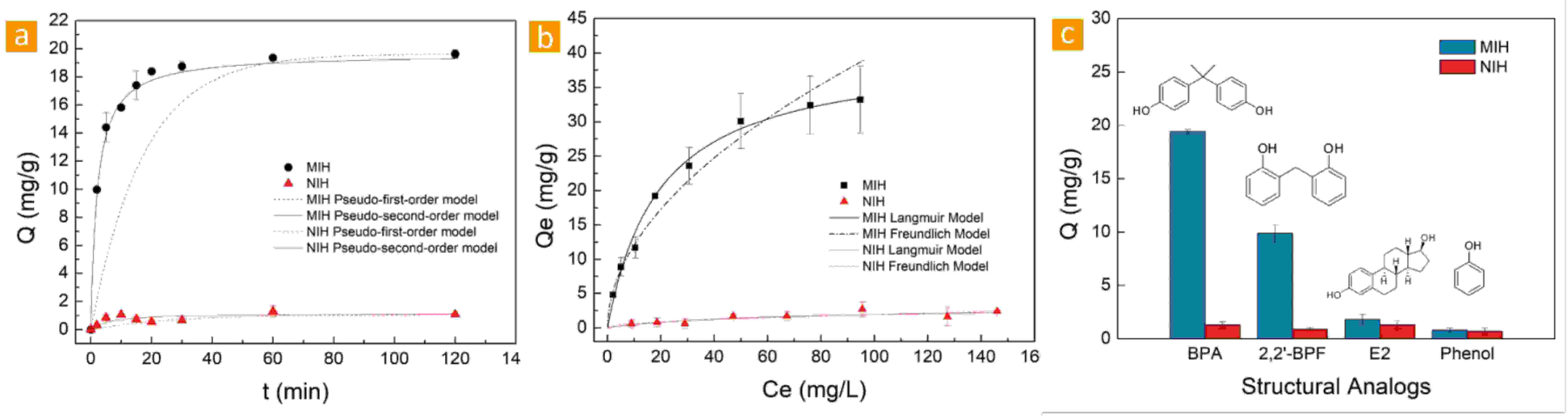


Figure 2.
- a Adsorption kinetic of MIH and NIH on BPA.
- b Adsorption isotherm of MIH and NIH on BPA.
- c Selective adsorption of MIH and NIH on BPA and its structural analogue.

CONCLUSION

The molecularly imprinted hybrid featured with SiO2-coated copolymer nanostructured demonstrated a high adsorption capacity, fast adsorption kinetic, and excellent selectivity for BPA adsorption. The exceptional functionality of MIH is expected to a promising target-selective adsorbent for advanced water purification.

財團法人中技社
CTCI FOUNDATION