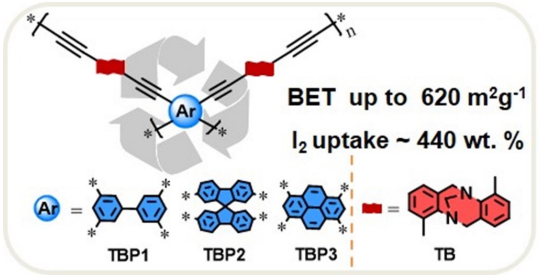
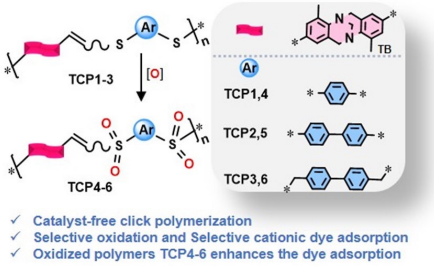
# Revisiting Tröger's Base: Microporous Copolymers Via Sonogashira Cross-coupling and Thiol-Yne Click Reactions For Superior Iodine and Dyes Uptake

B. Alameddine, N. Baig[1], S. Shetty[1]

[1]Gulf University for Science and Technology, Kuwait

Copolymers bearing Tröger's base were synthesized in very good yields using either a Sonogashira cross-coupling reaction or a catalyst-free thiol-yne click reaction[1,2]. Instrumental analysis of the target copolymers reveals their high chemical stability. Nitrogen adsorption measurements of some copolymers reveal Brunauer-Emmett-Teller (BET) surface areas ranging from ~586 $m^2$ $g^{-1}$ to ~620 $m^2$ $g^{-1}$. Inspection of the iodine adsorption properties of the copolymer networks made using Sonogashira cross-coupling reaction reveals their high iodine vapors uptake up to 440 wt% and removal of iodine from a hexane solution reaching ~77% ($q_e$ = 192 mg $g^{-1}$). On the other hand, the thioether units of the copolymers made from the thiol-yne click reaction were selectively oxidized into their respective sulfone derivatives under mild oxidation reaction conditions. Investigation of organic dyes uptake from water of the thiol-yne copolymers proves their potential application as selective adsorbents as proven by the quantitative removal of the cationic dye methylene blue (MEB) when compared to anionic dyes, such as, Congo red (CR), methyl orange (MO) and methyl blue (MB). The sulfone-containing copolymers display superior and faster MEB removal efficiencies with respect to their corresponding synthons.




[1] Shetty, S.; Baig, N.; Moustafa, M.S.; Al-Mousawi, S.; Alameddine, B. Sizable iodine uptake of porous copolymer networks bearing Tröger's base units. *Polymer* **2021**, *229*, 123996.
[2] Baig, N.; Shetty, S.; Moustafa, M.S.; Al-Mousawi, S.; Alameddine, B. Selective removal of toxic organic dyes using Tröger base-containing sulfone copolymers made from a metal-free thiol-yne click reaction followed by oxidation. *RSC Advances* **2021**, *11*, 21170-21178.