Liu Qing, J Chromatogr Sep Tech 2016, 7:6(Suppl)
http://dx.doi.org/10.4172/2157-7064.C1.019

2nd International Conference and Expo on
Separation Techniques
September 26-28, 2016 Valencia, Spain

Fabrication of electrospun nanofiber mat for tetracycline adsorption and other membrane separation processes

Liu Qing
Chinese Academy of Sciences, China

Electrospinning is a novel technique to produce nanofibers with a diameter of 100 nm to >1. In electrospinning, when a high voltage is supplied to a liquid droplet, a charged liquid jet is formed. The bending instability between the jets cause thinning and elongation of the fibers, subsequently, resulting in formation of uniform nanofibers, which have high specific area, porosity and interconnecting pore structures, thus, are suitable for energy and environmental applications. In our work, a novel Fe_3O_4/polyacrylonitrile (PAN) composite nanofiber mat was prepared by a simple two-step process, electrospinning and solvothermal method. Surface characterization demonstrated formation of a uniform cubic phase Fe_3O_4 nanoparticles coating (about 20 nm in thickness) on the PAN nanofiber backbone. The coating doubled the specific surface area of NFs, from 8.4-17.8 m^2g^{-1}, as confirmed by nitrogen sorption isotherm analysis. To evaluate the feasibility of Fe3O4/PAN composite NFs as a potential adsorbent for antibiotic removal, batch adsorption experiments were conducted using tetracycline (TC) as the model antibiotic molecule. The results showed that Fe_3O_4/PAN composite NFs was effective in removing tetracycline with no impactful loss of Fe at pH regime of environmental interest (4 to 8). The maximum adsorption capacity calculated from Langmuir isotherm model was 257.07 mg g^{-1} at pH 6. The composite NFs also exhibited good regenerability over repeated adsorption/desorption cycles. This highly effective and novel adsorbent can be easily modularized and separated, promising its huge potential in drinking and waste water treatment for antibiotic removal.

Biography

Liu Qing is currently pursuing her PhD at Institute of Urban Environment, Chinese Academy of Sciences, China. She has received her Master in Chemical Engineering at National University of Singapore. Her current research focus is in solving environmental issues such as water contamination and recovery, air pollution, using membrane separation techniques, in particular, by electrospinning. She has published 5 papers in reputed journals.

qliu@iue.ac.cn
liuq0004@gmail.com

Notes: