

Preparation of Cucurbituril-Loaded PVC Nanofiber Membrane for Metal Ion Recovery

Erwin Escobar^{1,2}, Grace Nisola¹,
Gebremichael Gebremedhn Tekeste¹,
Mengesha Daniel Nigusse¹, John Edward Sio¹,
Torrejos Rey Eliseo¹, 이성풍¹, 정욱진¹,
Limjuco Lawrence^{1,†}

¹Dept. of Energy Science and Technology, 명지대학교; ²Department of Engineering Science, University of the Philippines Los Banos
(renzlimjuco@gmail.com[†])

Effective tethering of cucurbituril (CBn) on azidized electrospun polyvinyl chloride (PVC) nanofiber (NF) was performed. The tethering strategy takes advantage of the spontaneous generation of nitrenes from azido groups as a consequence of either UV irradiation or thermolysis. Although immobilized CBn would assume different orientations due to the tendency of nitrenes to insert liberally and non-selectively into C-H bonds, their metal cation receptor capability nevertheless remains remarkably potent since the carbonyl rims are essentially unaltered. As such, the tendency for a 2:1 metal to CBn complexation ratio was observed. Batch adsorption experiments show that the CBn-loaded PVC NF may be used to capture metal ions from aqueous media. This research was supported by the National Research Foundation of Korea (NRF) funded by the Ministry of Science and ICT (No. 2018R1D1A1B07047503 and No. 2017R1A2B2002109) and by the Ministry of Education (No. 2009-0093816).