conferenceseries.com

J Chem Eng Process Technol 2018, Volume 9
DOI: 10.4172/2157-7048-C1-012

8th World Congress on

Biopolymers & Bioplastics

June 28-29, 2018 | Berlin, Germany

Modified novel nanocellulose bioadsorbent for enhanced recovery of boron

Fahanwi Asabuwa Ngwabebhoh, Nigar Memmedli and **Ufuk Yildiz***
Kocaeli University, Turkey

Nanocellulose is a renewable material that incorporates a high surface area, high strength and adaptable surface chemistry. In the current study, platelet shaped gels of modified nanocellulose were facilely prepared and applied for enhanced recovery of boron. The modified nanocellulose gels were characterized by a range of techniques and the results revealed good thermal and mechanical stability, surface area of 42.8 m^2/g, zeta potential of -31.2 ± 0.66 mV and amine content of ~1500 µmol/g with a degree of substitution ≈ 0.14 for prepared gels. Optimization by Taguchi model design was further attempted and developed to investigate the effect and significance of input factors influencing boron recovery from aqueous phase. Under optimized conditions, 87.38 % (≈120.9 mg/g) boron recovery efficiency was recorded at pH 7. Kinetic evaluations determined the pseudo 2nd-order model (R2 = 0.997) to best describe the recovery process with majority of the adsorption occurring via intraparticle diffusion. Thermodynamic study determined the adsorption system to be spontaneous and exothermic in nature. In addition, recyclability investigations of the bioadsorbent proved feasible and reusable for at least four consecutive adsorption/desorption cycles with minimum recovery efficiency loss.

uyildiz@kocaeli.edu.tr