



## **NANOFIBER ALGINAT/POLIETILEN OKSIDA/TRITON X-100 SEBAGAI ADSORBEN CO<sub>2</sub>**

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### **INTISARI**

Penelitian tentang sintesis nanofiber Alginat/Polietilen oksida/Triton X-100 (Alg/PEO/TX Nfs) dengan metode *electrospinning* untuk adsorpsi CO<sub>2</sub> telah dilakukan. Penelitian ini bertujuan untuk memperoleh komposisi Alg/PEO yang dapat menghasilkan serat tanpa manik-manik, pengaruh penambahan PEO dan TX terhadap *electrospinnability* larutan, pengaruh laju alir dan waktu kontak terhadap kapasitas adsorpsi, serta kajian isoterm adsorpsi CO<sub>2</sub> oleh Alg/PEO/TX Nfs. Larutan polimer dikarakterisasi dengan *conductivity meter* dan *tensiometer*, sedangkan nanofiber dianalisis menggunakan FTIR, SEM, SAA dan *testing machine*. Kajian adsorpsi CO<sub>2</sub> pada nanofiber meliputi pengaruh laju alir dan waktu kontak CO<sub>2</sub> terhadap nanofiber, kemudian dipelajari isoterm adsorpsinya.

Hasil penelitian menunjukkan bahwa Alg/PEO/TX Nfs tanpa manik-manik berhasil disintesis dari larutan Alg/PEO dengan perbandingan volume 1:2 serta penambahan 0,5% TX. Nanofiber yang dihasilkan berdiameter  $201,567 \pm 48$  nm, dan memiliki ketahanan mekanik serta luas permukaan sebesar 0,524 MPa dan 34,963 m<sup>2</sup> g<sup>-1</sup>. Kapasitas adsorpsi optimum diperoleh pada laju 10 mL menit<sup>-1</sup> dengan waktu kontak 25 menit yaitu 12,398 mmol g<sup>-1</sup>. Adsorpsi CO<sub>2</sub> oleh Alg/PEO/TX Nfs mengikuti model isoterm Langmuir.

Kata kunci: nanofiber, *electrospinning*, alginat, PEO, CO<sub>2</sub>



## **ALGINATE/POLYETHYLENE OXIDE/TRITON X-100 NANOFIBER AS CO<sub>2</sub> ADSORBENT**

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### **ABSTRACT**

Synthesis of Alginate/Polyethylene oxide/Triton X-100 nanofiber (Alg/PEO/TX Nfs) by electrospinning method for CO<sub>2</sub> adsorption has been conducted. This study aimed to obtain a composition of Alg/PEO to produce nanofiber without beads, to observe the effect of adding PEO and Triton X-100 (TX) toward electrospinnability solution, to observe the effect of flow rate and contact time toward adsorption capacity, and to study the adsorption isotherms of CO<sub>2</sub> by Alg/PEO/TX Nfs. The polymer solution was characterized by a conductivity meter and tensiometer, while nanofiber was analyzed by using FTIR, SEM, SAA and testing machine. The study of CO<sub>2</sub> adsorption on nanofiber consist of the effect of flow rate and contact time of CO<sub>2</sub> to the nanofiber, afterwards the adsorption isotherms and reaction kinetics were reviewed.

The result showed that Alg/PEO/TX Nfs without beads was successfully synthesized from a mixture solution of Alg/PEO with the volume ratio of 1:2, and the addition of 0.5% TX. The diameter of synthesized nanofiber, the mechanical resistance and the surface area were  $201.567 \pm 48$  nm, 0.524 Mpa and  $34.963 \text{ m}^2\text{g}^{-1}$ , respectively. The optimum adsorption capacity was  $12.398 \text{ mmol g}^{-1}$ , obtained at the flow rate of  $10 \text{ mL min}^{-1}$  and contact time of 25 minutes. The adsorption of CO<sub>2</sub> by Alg/PEO/TX Nfs followed Langmuir isotherm.

Key words: nanofiber, electrospinning, alginate, PEO, CO<sub>2</sub>