

NANOFIBER ALGINAT-PEKTIN-POLIVINIL ALKOHOL SEBAGAI ADSORBEN CO₂

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INTISARI

Telah dilakukan pembuatan nanofiber alginat-pektin-polivinil alkohol (Alg-P-PVA NFs) dengan metode *electrospinning* untuk adsorpsi CO₂. Penelitian ini bertujuan untuk mendapatkan komposisi alginat-pektin-polivinil alkohol (Alg-P-PVA) yang menghasilkan nanofiber mulus tanpa muncul manik-manik, mengetahui pengaruh jumlah Alg-P terhadap kapasitas adsorpsi CO₂, dan pola isotherm adsorpsi CO₂ oleh Alg-P-PVA NFs.

Nanofiber yang terbentuk dikarakterisasi dengan FTIR, SEM, *conductivity meter*, dan *surface area analyzer*. Uji kapasitas adsorpsi nanofiber terhadap CO₂ meliputi pengaruh laju alir CO₂, waktu kontak CO₂ dengan nanofiber, dan perbandingan volume Alg-P:PVA. Isotherm adsorpsi CO₂ oleh Alg-P-PVA NFs juga dikaji dalam penelitian ini.

Hasil penelitian menunjukkan nanofiber mulus tanpa manik-manik berhasil dibuat dari campuran Alg-P 4% (b/b) dengan tambahan PVA 12% (b/b) dengan perbandingan volume 10:90, 15:85, 20:80, 25:75, dan 30:70 (v/v). Kapasitas adsorpsi optimum diperoleh pada perbandingan volume Alg-P:PVA 30:70 (v/v) sebesar 9,68 mmol g⁻¹ pada laju alir 30 mL menit⁻¹ dan waktu kontak 20 menit. Adsorpsi CO₂ oleh Alg-P-PVA NFs mengikuti isotherm Langmuir.

Kata Kunci: Nanofiber, alginat, pektin, polivinil alkohol, *electrospinning*, adsorpsi, CO₂

ALGINATE-PECTIN-POLYVINYL ALCOHOL NANOFIBERS AS CO₂ ADSORBENT

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ABSTRACT

Alginate-pectin-polyvinyl alcohol nanofibers (Alg-P-PVA NFs) had been made by electrospinning method as a CO₂ adsorbent. This research was aimed to get alginate-pectin-polyvinyl alcohol (Alg-P-PVA) composition to produce smooth nanofibers without any beads, to evaluate the effect of Alg-P amount into adsorption capacity of CO₂, and isotherm adsorption of CO₂ by Alg-P-PVA NFs.

Nanofibers were characterized by FTIR, SEM, conductivity meter and surface area analyzer. Capacity adsorption of nanofibers toward CO₂ was studied including the effect of CO₂ flow rate, CO₂ contact time, and the volume ratio of Alg-P:PVA. Isotherm of CO₂ adsorption by nanofibers was also studied.

The result showed that smooth nanofibers had been made successfully from Alg-P blend 4% (w/w) added with PVA 12% (w/w) with a volume ratio of 10:90, 15:85, 20:80, 25:75, and 30:70 (v/v). The optimum adsorption capacity of nanofibers was 9.68 mmol g⁻¹ when nanofiber with a volume ratio of Alg-P:PVA 30:70 (v/v) had contact time with CO₂ of 20 min and CO₂ flow rate of 20 mL min⁻¹. Carbon dioxide adsorption by Alg-P-PVA NFs followed Langmuir isotherm.

Keywords: Nanofibers, alginate, pectin, polyvinyl alcohol, electrospinning, adsorption, CO₂