

Article

Pervaporation of Aqueous Ethanol Solutions through Rigid Composite Polyvinyl-Alcohol/Bacterial Cellulose Membranes

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Table S1. Data and results of regression analysis (2³ experimental plan) for ethanol-water pervaporation through PVA-BC 12/6 membrane (M1)

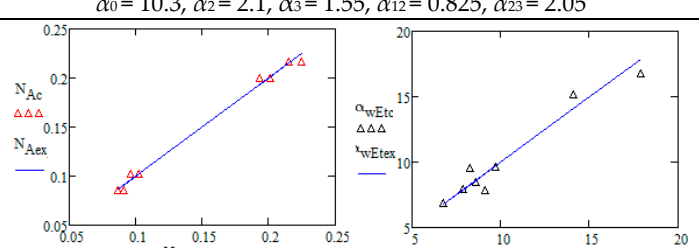
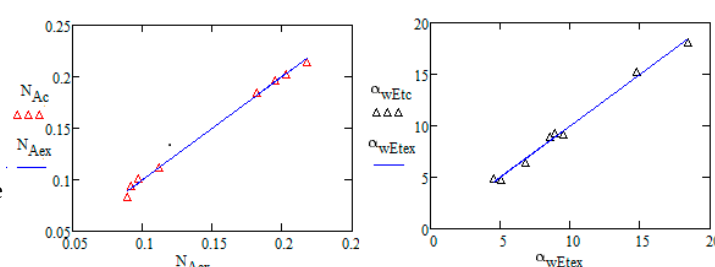
Experimental data matrix (Data) and reproducibility matrix for N_A (Repro1) and $\alpha_{w/et}$ (Repro2)	$\text{Data} := \begin{pmatrix} 1 & -1 & -1 & -1 & 0.193 & 8.3 \\ 2 & 1 & -1 & -1 & 0.215 & 9.1 \\ 3 & -1 & 1 & -1 & 0.201 & 7.9 \\ 4 & 1 & 1 & -1 & 0.225 & 9.7 \\ 5 & -1 & -1 & 1 & 0.087 & 8.6 \\ 6 & 1 & -1 & 1 & 0.096 & 6.8 \\ 7 & -1 & 1 & 1 & 0.091 & 14.1 \\ 8 & 1 & 1 & 1 & 0.102 & 17.9 \end{pmatrix}$	$\text{Repro1} := \begin{pmatrix} 1 & 0 & 0 & 0 & 0.151 \\ 2 & 0 & 0 & 0 & 0.153 \\ 3 & 0 & 0 & 0 & 0.158 \end{pmatrix}$	$\text{Repro2} := \begin{pmatrix} 1 & 0 & 0 & 0 & 10.9 \\ 2 & 0 & 0 & 0 & 10.4 \\ 3 & 0 & 0 & 0 & 9.9 \end{pmatrix}$
Significant β coefficients	$\beta_0 = 0.151, \beta_1 = 0.008, \beta_3 = -0.057$		
Significant α coefficients	$\alpha_0 = 10.3, \alpha_2 = 2.1, \alpha_3 = 1.55, \alpha_{12} = 0.825, \alpha_{23} = 2.05$		
Parity representations for N_A and $\alpha_{w/et}$ (N_{Aex} from Data and N_{Aex} computed with x_1, x_2, x_3 from Data depending on the significant coefficients; the same for $\alpha_{w/etex}$ and $\alpha_{w/etc}$)			

Table S2. Data and results of regression analysis (2^3 experimental plan) for ethanol-water pervaporation through PVA-BC 12/12 membrane (M2)

Experimental data matrix (Data) and reproducibility matrix for N_A (Repro1) and $\alpha_{w/et}$ (Repro2)	$\text{Data} := \begin{pmatrix} 1 & -1 & -1 & -1 & 0.182 & 8.6 \\ 2 & 1 & -1 & -1 & 0.203 & 9.5 \\ 3 & -1 & 1 & -1 & 0.195 & 4.5 \\ 4 & 1 & 1 & -1 & 0.218 & 5.1 \\ 5 & -1 & -1 & 1 & 0.089 & 8.9 \\ 6 & 1 & -1 & 1 & 0.097 & 6.8 \\ 7 & -1 & 1 & 1 & 0.092 & 14.8 \\ 8 & 1 & 1 & 1 & 0.112 & 18.42 \end{pmatrix}$	$\text{Repro1} := \begin{pmatrix} 1 & 0 & 0 & 0 & 0.151 \\ 2 & 0 & 0 & 0 & 0.148 \\ 3 & 0 & 0 & 0 & 0.147 \end{pmatrix}$	$\text{Repro2} := \begin{pmatrix} 1 & 0 & 0 & 0 & 9.2 \\ 2 & 0 & 0 & 0 & 9.6 \\ 3 & 0 & 0 & 0 & 9.9 \end{pmatrix}$
Significant β coefficients	$\beta_0 = 0.149, \beta_1 = 0.009, \beta_2 = 0.0057, \beta_3 = -0.051$		
Significant α coefficients	$\alpha_0 = 9.58, \alpha_2 = 1.1, \alpha_3 = 2.65, \alpha_{12} = 0.68, \alpha_{23} = 3.25, \alpha_{123} = 0.75$		

Parity representations for N_A and $\alpha_{w/et}$ (N_{Aex} from Data and N_{Ac} computed with x_1, x_2, x_3 from Data depending on the significant coefficients; the same for $\alpha_{w/etex}$ and $\alpha_{w/etec}$)

**Table S3.** Data and results of regression analysis (2^3 experimental plan) for ethanol-water pervaporation through PVA-BC 12/18 membrane (M3)

Experimental data matrix (Data) and reproducibility matrix for N_A (Repro1) and $\alpha_{w/et}$ (Repro2)	$\text{Data} := \begin{pmatrix} 1 & -1 & -1 & -1 & 0.139 & 7.5 \\ 2 & 1 & -1 & -1 & 0.175 & 8.9 \\ 3 & -1 & 1 & -1 & 0.148 & 9.5 \\ 4 & 1 & 1 & -1 & 0.184 & 10.6 \\ 5 & -1 & -1 & 1 & 0.085 & 11.2 \\ 6 & 1 & -1 & 1 & 0.096 & 12.1 \\ 7 & -1 & 1 & 1 & 0.091 & 16.5 \\ 8 & 1 & 1 & 1 & 0.102 & 22.9 \end{pmatrix}$	$\text{Repro1} := \begin{pmatrix} 1 & 0 & 0 & 0 & 0.124 \\ 2 & 0 & 0 & 0 & 0.127 \\ 3 & 0 & 0 & 0 & 0.131 \end{pmatrix}$	$\text{Repro2} := \begin{pmatrix} 1 & 0 & 0 & 0 & 11.9 \\ 2 & 0 & 0 & 0 & 12.5 \\ 3 & 0 & 0 & 0 & 12.9 \end{pmatrix}$
Significant β coefficients	$\beta_0 = 0.127, \beta_1 = 0.012, \beta_3 = -0.034, \beta_{13} = -0.0062$		
Significant α coefficients	$\alpha_0 = 12.4, \alpha_1 = 1.225, \alpha_2 = 2.475, \alpha_3 = 3.275, \alpha_{23} = 1.55$		

Parity representation for N_A and $\alpha_{w/et}$ (N_{Aex} from Data and N_{Ac} computed with x_1, x_2, x_3 from Data depending on the significant coefficients; the same for $\alpha_{w/etex}$ and $\alpha_{w/etec}$)

