

การแยกดีเอ็นเอจากน้ำในหอทดลองแบบฟลูออโรสโตน



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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

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REMOVAL OF IMPURITIES FROM WATER IN FLUIDIZING COLUMN

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หัวข้อวิทยานิพนธ์
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การแยกสิ่งเจือปนจากน้ำในหอทดลองแบบฟลูอิดิงคอสมันน์
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บทคัดย่อ

งานวิจัยนี้เป็นการใช้เทคนิคของฟลูอิดเซชันในการศึกษาการดูดซับในสารละลาย สารละลายที่ใช้ มีทั้งสารละลายที่มีตัวถูกทำละลายเดียว และผสม สารดูดซับที่ใช้คือ แอคติเวเตดคาร์บอนชนิด เอส จี แอล และสารถูกดูดซับที่ใช้ในการทดลองคือ ฟอรัมอลดีไฮด์ โซเดียมไฮดรอกไซด์ โซเดียมคาร์บอเนต และสารผสมระหว่างโซเดียมไฮดรอกไซด์ กับ โซเดียมคาร์บอเนต

จากการทดลองพบว่า ความเข้มข้นของสารละลายความเร็วของสารละลายที่ไหลเข้าสู่ระบบ และขนาดของสารดูดซับจะมีความสัมพันธ์กับอัตราการถ่ายเทมวลของสารถูกดูดซับ และค่าสัมประสิทธิ์การถ่ายเทมวลสาร

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NOMENCLATURE

Symbols	Definitions	Dimensions
a	Constant in Langmuir Equation for Liquid phase	-
$(a_v)_c$	Surface area of adsorbent per volume of bed	L^2/L^3
A	Constant in Freundlich equation for Liquid phase	-
b	Constant in Langmuir equation for Liquid phase	-
C	Bulk concentration of Liquid phase	ML^{-3}
C_o	Concentration of solute in influent to bed	ML^{-3}
C_s	Saturated concentration	ML^{-3}
C^*	Concentration of solute at solid surface side of interfacial film	ML^{-3}
d_p	Average diameter of particle	L
\bar{d}	Constant in BET equation	-
f_m	Friction factor, a function of Re_p	-
G	Fluid superficial mass velocity base on empty Chamber cross section	$MT^{-1}L^{-2}$
Ga	Galileo number	-
g	Accereration of gravity	LT^{-2}
k_f	Mass transfer coefficient by external diffusion	LT^{-1}
k_p	Mass transfer coefficient by internal diffusion	LT^{-1}
L	Height of bed	L
L_{mf}	Bed height at minimum fluidizing condition	L



Symbols	Definitions	Dimensions
M	Mass transfer rate	$MM^{-1}T^{-1}$
m	Mass adsorbate per unit mass of adsorbent	M/M
m_c	Mass of adsorbent	M
m_{H_2O}	Mass of water	M
m^*	Mass adsorbate per unit mass of adsorbent at equilibrium with c^*	M/M
N	Normality	ML^{-3}
n	Constant in Freundlich equation	-
n^*	Exponent a function of the modified Reynolds number Re_p , dimensionless	-
p	Fluid pressure	$ML^{-1}T^{-2}$
ΔP	Pressure drop	$ML^{-1}T^{-2}$
p_o	Vapor pressure	$ML^{-1}T^{-2}$
q	Volumetric flow rate	L^3T^{-1}
Re_p	Modified Reynolds number	-
R_{emf}	Modified Reynolds number at minimum fluidizing condition	-
r	Radius of spherical particle	L
\bar{r}_p	The mean pore radius A^o	L
S	Surface area per unit mass of adsorbent	LM^{-1}
T	Absolute temperate	t
t	Time	T
u	Velocity of fluid	LT^{-1}
u_{mf}	Velocity of fluid at minimum fluidizing condition	LT^{-1}
V_p	Pore Volume of adsorbent	L^3

Symbols	Definitions	Dimensions
V_{pores}	Volume of pore in fluidized bed	L^3
ϵ	Void fraction in a bed	-
ϵ_{mf}	Void fraction in a bed at minimum fluidizing conditions	-
μ	Viscosity of fluid	$ML^{-1}T^{-1}$
ρ_f	Density of fluid	ML^{-3}
ρ_s	Density of solid	ML^{-3}
ϕ	Shape factor	-