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สำหรับระบบคาร์บอนไดออกไซด์-พาราฟิน



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**BINARY INTERACTION PARAMETERS OF SOME CUBIC EQUATIONS
OF STATE FOR CARBON DIOXIDE-PARAFFIN BINARY SYSTEMS**



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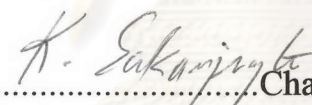
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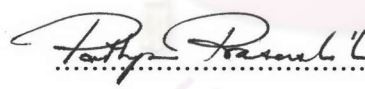


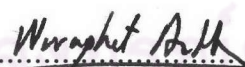
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พิมพ์ต้นฉบับบทคัดย่อวิทยานิพนธ์ภายในกรอบสี่เหลี่ยมนี้เพียงแผ่นเดียว

พงษ์พิศณุ เมืองเจริญ : ค่าพารามิเตอร์อันตรกิริยาคู่ในสมการสถานะกำลังสำหรับระบบคาร์บอนไดออกไซด์ - พาราฟิน (BINARY INTERACTION PARAMETERS OF SOME CUBIC EQUATIONS OF STATE FOR CARBON DIOXIDE - PARAFFIN BINARY SYSTEMS) อ. ที่ปรึกษา : รศ.ดร. ภัทรพรหม ประศาสน์สารกิจ, 184 หน้า. ISBN 974-584-343-1

งานวิจัยนี้เป็นการทดสอบสมการสถานะห้าสมการ ได้แก่ สมการสถานะโจฟ-เรดคลิช-กวง (SRK), สมการสถานะเปง-โรบินสัน (PR), สมการสถานะพาเทล-เทจา (PT), สมการสถานะที่ดัดแปลงจากสมการของโจฟ-เรดคลิช-กวง (MSRK) และสมการสถานะที่ดัดแปลงจากสมการของเปง-โรบินสัน (MPR) ในการคำนวณสมดุลย์ไอ-ของเหลว ของระบบองค์ประกอบคู่ ได้แก่ ระบบคาร์บอนไดออกไซด์, ระบบไนโตรเจน และระบบพาราฟินซึ่งมีจำนวนคาร์บอนอะตอมตั้งแต่หนึ่งถึงสิบ สำหรับสัมประสิทธิ์อันตรกิริยาคู่ (K_{ij}) ที่ใช้ในระบบของทั้งห้าสมการได้มาจากการหาค่าที่เหมาะสม โดยสมการวัตถุประสงค์สองสมการ คือ วิธีฟูกาซิตีและความดันจุดบับเบิล

ผลที่ได้จากสองวิธีนี้ พบว่าวิธีแรกให้ค่า K_{ij} สำหรับการคำนวณสมดุลย์ไอ-ของเหลวในเกณฑ์ใช้ได้โดยใช้เวลาในการคำนวณน้อยมาก ขณะที่วิธีหลังให้ค่าการคำนวณที่ต่ำกว่า นอกจากนั้นการใช้ค่า K_{ij} ประกอบในการคำนวณได้แสดงให้เห็นว่า สามารถเพิ่มความแม่นยำขึ้นสำหรับทุกสมการ โดยสมการ MSRK และ MPR ให้ผลที่ดีกว่าสำหรับระบบไฮโดรคาร์บอน-ไฮโดรคาร์บอน ขณะที่สมการ PR และ PT ให้ผลที่ดีกว่าสำหรับระบบไฮโดรคาร์บอน-ไม่เป็นไฮโดรคาร์บอน

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

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ลายมือชื่ออาจารย์ที่ปรึกษา
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The Soave-Redlich-Kwong (SRK), Peng-Robinson (PR), Patel-Teja (PT), Modified Soave (MSRK) and Modified Peng-Robinson (MPR) was applied to the calculation of Vapor-Liquid Equilibrium (VLE) of binary systems containing CO₂, N₂ and C₁-C₁₀ n-paraffins. The binary interaction parameters, K_{ij} for each equation were evaluated from binary experimental data through the optimization of two objective functions, the fugacity and bubble point pressure criteria.

The results from two criteria showed that the former provided an acceptable VLE prediction with a considerable reduction in computing time requirement while the latter yielded better K_{ij} values. It was also proved that incorporation of the K_{ij} term offered accuracy improvement for all equations. A comparison of the VLE results indicated that the MSRK and MPR equations performed better than the other equations for hydrocarbon-hydrocarbon systems while the PR and PT equations performed better for hydrocarbon - non-hydrocarbon systems.

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NOTATIONS

a, b, c	= equation of state constants
A, B, C	= equation of state constants
f_i	= fugacity of component i
\hat{f}_i	= partial fugacity of component i
F	= PT characteristic parameter
g, h	= MSRK parameters
K_i	= equilibrium ratio
K_{ij}	= binary interaction parameter
m	= characteristic constant
MSRK	= modified Soave equation of state
MPR	= modified Peng-Robinson equation of state
P_c	= critical pressure
PR	= Peng-Robinson equation of state
PT	= Patel-Teja equation of state
R	= universal gas constant
SRK	= Soave-Redlich-Kwong equation of state
SW	= Schmidt-Wenzel equation of state
T	= temperature
T_c	= critical temperature
V	= molal volume
x_i	= mole fraction of component in the liquid phase
y_i	= mole fraction of component in the gas phase
z_i	= mole fraction of component in the gas or liquid phase
Z	= gas compressibility factor
Z_c	= critical compressibility factor
α	= correction factor for EOS constant a
ϕ_i	= fugacity coefficient of component i
$\hat{\phi}_i$	= partial fugacity coefficient of component i
$\Omega_a, \Omega_b, \Omega_c$	= EOS constants
ω	= acentric factor
β, η	= MPR parameters
ξ	= PT compressibility factor

NOTATIONS (Continued)**Superscripts**

L	= liquid phase
V	= vapor phase
EXP	= experimental value
CAL	= calculated value

Subscripts

c	= critical
i	= component identifier
j	= component identifier
m	= mixture



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