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SYNTHESIS OF MARKER DYES FROM SALICYLALDEHYDE
AND AROMATIC AMINES

Miss Natthiya Sompakdee

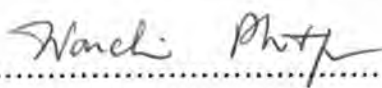
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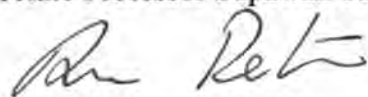
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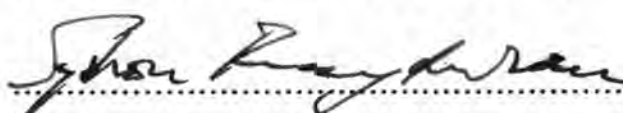
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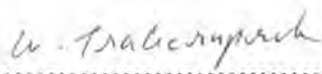
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ณัฐยา สมภักดี: การสังเคราะห์สีย้อมทำเครื่องหมายจากซาลิซิลัลดีไฮด์และแอมีนโดยเตรียมสารประกอบ
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สีย้อมทำเครื่องหมายสังเคราะห์ขึ้นจากซาลิซิลัลดีไฮด์และแอมีนโดยเตรียมสารประกอบ
อิมินและให้สารประกอบนี้ทำปฏิกิริยากับสารประกอบเกลือไดอะโซเนียมของอนุพันธ์แอนิลีนที่มีหมู่
แทนที่ต่าง ๆ กัน สีย้อมที่สังเคราะห์นี้สามารถตรวจวัดได้โดยการสกัดด้วยสารละลายของเอทิลีนไดแอม
มีน 20% ในโพรพิลีนไกลคอล สีย้อมทำเครื่องหมายสามารถเติมลงในน้ำมันดีเซลที่ระดับการใช้ 1-10
ส่วนในล้านส่วนโดยไม่ทำให้เกิดการเปลี่ยนแปลงที่สังเกตเห็นได้ การศึกษาปริมาณวิเคราะห์ของสี
ย้อมทำเครื่องหมายศึกษาด้วยเทคนิคทางอัลตราไวโอเลตและวิสิเบิลสเปกโตรสโกปีพบว่าสามารถ
สกัดสีย้อมทำเครื่องหมายได้ถึง 97.4% ผลกระทบของสีย้อมทำเครื่องหมายที่มีต่อสมบัติทางกาย
ภาพของน้ำมันดีเซลที่เติมสีย้อมทำเครื่องหมายศึกษาโดยใช้วิธีทดสอบตาม ASTM ผลที่ได้พบว่าสี
ย้อมทำเครื่องหมายไม่มีผลกระทบต่อสมบัติทางกายภาพของน้ำมันดีเซล นอกจากนี้สีย้อมทำเครื่อง
หมายสามารถคงตัวอยู่ในน้ำมันดีเซลเป็นเวลาอย่างน้อย 3 เดือน ดังนั้นสีย้อมทำเครื่องหมายที่
สังเคราะห์ได้นี้เหมาะสมที่จะใช้เป็นสารทำเครื่องหมายในน้ำมันดีเซล

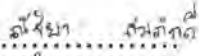
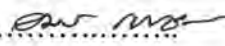
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Marker dyes were synthesized from salicylaldehyde and amine by preparing imine compounds and allowing them react with diazonium salts of aniline derivatives having different substituents. These synthetic marker dyes could be detected by extracting them with a solution of 20% ethylenediamine in propylene glycol. The marker dyes could be added into diesel oil at usable levels of 1-10 parts per million (ppm) without imparting any color to the naked eyes. Quantitative determination of these marker dyes was accomplished using UV/VIS spectroscopy with 97.4% recovery of the extracted marker dye. The effects of marker dye on physical properties of marked diesel oil were also studied using ASTM test methods. As a result, the marker dye was found to have no effect on the physical properties of diesel oil. Moreover, these marker dyes were stable in diesel oil for at least three months. Accordingly, these synthetic marker dyes had good potential to be used as marker in diesel oil.

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List of Abbreviations

ASTM	The American Society for Testing and Materials
Ave	Average
<i>br</i>	Broad
δ	Chemical Shift
cm^{-1}	Unit of wavenumber
cSt	Centi Stroke
Corr	Corrected
$^{\circ}\text{C}$	Degree Celsius
<i>d</i>	Doublet
<i>dd</i>	Doublets of doublet
FT-IR	Fourier-Transform Infrared spectroscopy
Fig	Figure
g	Gram
Hz	Hertz
Hr	Hour
IBP	Initial Boiling Point
J	Coupling constant
ml	Milliliter
<i>m</i>	Multiplet
nm	Nanometer
λ_{max}	Maximum wavelength
NMR	Nuclear Magnetic Resonance spectroscopy
ppm	Parts per million
<i>s</i>	Singlet
Temp	Temperature
<i>t</i>	Triplet
UV/VIS	Ultraviolet/Visible spectrophotometry