

ผลกระทบของการใช้สารช่วยกระจายตัวต่อสารพอลิไซคลิกอะโรมาติก
ไฮโดรคาร์บอนในไอเสียจากเครื่องยนต์แก๊ซลิ้น

นายกานต์ วัชรเกียรติพงศ์



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

สหสาขาวิชาปิโตรเคมี-โพลีเมอร์

บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย

ปีการศึกษา 2539

ISBN 974-636-654-8

ลิขสิทธิ์ของบัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย

I17606895

**THE EFFECT OF DISPERSANT ON POLYCYCLIC AROMATIC
HYDROCARBONS IN GASOLINE ENGINE EXHAUST**

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A Thesis Submitted in Partial Fulfillment of the Requirements

for the Degree of Master of Science

Multidisciplinary of Petrochemistry and Polymer

Graduate School


Chulalongkorn University

Academic Year 1996

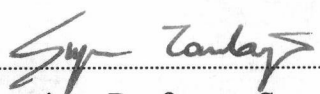
ISBN 974-636-654-8

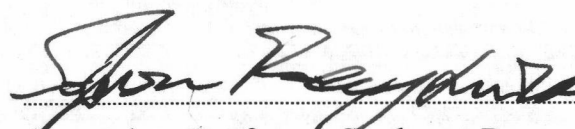
Thesis Title THE EFFECT OF DISPERSANT ON POLYCYCLIC
AROMATIC HYDROCARBONS IN GASOLINE
ENGINE EXHAUST
By Mr.Kant Wacharakitiphong
Program Petrochemistry
Thesis Advisor Associate Professor Sophon Roengsumran, Ph.D.

Accepted by the Graduate School, Chulalongkorn University in
Partial Fulfillment of the Requirements for the Masters's Degree.

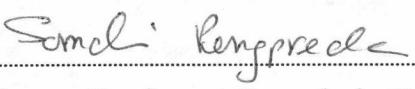

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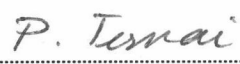
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พิมพ์ต้นฉบับบทความวิจัยวิทยานิพนธ์ภายในกรอบสี่เหลี่ยมนี้เพียงแผ่นเดียว

กานต์ วัชรกิติพงศ์ : ผลกระทบของการใช้สารช่วยกระจายตัวต่อสารพอลิไซคลิกอะโรมาติกไฮโดรคาร์บอนในไอเสียจากเครื่องยนต์แก๊ซอลีน (THE EFFECT OF DISPERSANT ON POLYCYCLIC AROMATIC HYDROCARBONS IN GASOLINE ENGINE EXHAUST)
อ. ที่ปรึกษา: รศ. ดร. โสภณ เรืองสำราญ, 107 หน้า. ISBN 974-636-654-8.

การวิจัยนี้เป็นการศึกษาผลกระทบของการใช้สารเติมแต่งประเภทสารช่วยกระจายตัว (Dispersant) และความเร็วรอบเครื่องยนต์ (Speed) ที่มีต่อสารพอลิไซคลิกอะโรมาติกไฮโดรคาร์บอน (Polycyclic Aromatic Hydrocarbons; PAHs) ในไอเสียจากเครื่องยนต์แก๊ซอลีน การวิจัยใช้เครื่องยนต์ขนาด 4 สูบ ความจุกระบอกสูบรวม 1,500 ลูกบาศก์เซนติเมตร อนุภาคขนาดเล็ก (Particulates) และสารกึ่งระเหย (Semivolatile gases) จากไอเสียถูกเก็บรวบรวมด้วยแผ่นกรองใยแก้ว (Glass microfibre) และโพลีโพลียูรีเทน ตามลำดับ ตัวอย่างถูกนำมาสกัดแยกด้วยเครื่องสกัดแยกแบบ Soxhlet โดยใช้ไซโคลเฮกเซน แล้วทำให้เข้มข้นขึ้นก่อนนำไปวิเคราะห์ด้วยเครื่องแก๊สโครมาโตกราฟ-แมสสเปกโตรมิเตอร์ สารพอลิไซคลิกอะโรมาติกไฮโดรคาร์บอนที่พบในไอเสียจากเครื่องยนต์ทดสอบคือ naphthalene, acenaphthylene, fluorene, phenanthrene, anthracene, fluoranthene และ pyrene ผลการศึกษาแสดงให้เห็นว่าความเร็วรอบของเครื่องยนต์มีผลต่อปริมาณสารพอลิไซคลิกอะโรมาติกไฮโดรคาร์บอนในไอเสีย ความเร็วรอบที่เหมาะสมซึ่งทำให้มีปริมาณสารพอลิไซคลิกอะโรมาติกไฮโดรคาร์บอนในไอเสียต่ำที่สุดคือ 1,500 รอบต่อนาที ปริมาณสารพอลิไซคลิกอะโรมาติกไฮโดรคาร์บอนในไอเสียถูกพบมากขึ้นเมื่อความเร็วรอบสูงขึ้น สารพอลิไซคลิกอะโรมาติกไฮโดรคาร์บอนในไอเสียยังขึ้นอยู่กับสารช่วยกระจายตัวในน้ำมันแก๊ซอลีน ปริมาณสารช่วยกระจายตัวที่ให้ประสิทธิภาพสูงที่สุดในการลดปริมาณสารพอลิไซคลิกอะโรมาติกไฮโดรคาร์บอนในไอเสียคือ 400 ส่วนในล้านส่วน (โดยปริมาตร)

ภาควิชา สาขาวิชาปิโตรเคมี-โพลีเมอร์
สาขาวิชา ปิโตรเคมี
ปีการศึกษา 2539

ลายมือชื่อนิสิต
ลายมือชื่ออาจารย์ที่ปรึกษา
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม

C785076 : MAJOR PETROCHEMISTRY

KEY WORD: POLYCYCLIC AROMATIC HYDROCARBONS / PAHs / EXHAUST EMISSION /
GASOLINE ENGINE COMBUSTION / DISPERSANT / GASOLINE ADDITIVE

KANT WACHARAKITIPHONG : THE EFFECT OF DISPERSANT ON
POLYCYCLIC AROMATIC HYDROCARBONS IN GASOLINE ENGINE EXHAUST.

THESIS ADVISOR : ASSO. PROF. SOPHON ROENGSUMRAN, Ph.D. 107 pp.
ISBN 974-636-654-8.

The effects of dispersant gasoline additive and engine speeds on polycyclic aromatic hydrocarbons (PAHs) emitted in the exhaust emission of a gasoline engine were studied. The test was performed by employing the four-cylinder engine with displacement volume of 1,500 cm³. The particulates and semivolatile gases from exhaust emission were collected by glass microfibre filters and polyurethane foams, respectively. The samples were then subjected to the Soxhlet extraction with cyclohexane and concentrated before analysis by GC/MS. PAHs recovered from the test engine exhaust emission were naphthalene, acenaphthylene, fluorene, phenanthrene, anthracene, fluoranthene, and pyrene. The results show that the engine speed influences the amount of total PAHs. The optimum engine speed at which the emission of PAHs is lowest is 1,500 rpm. The higher amount of PAHs was recovered when the engine speed increases. PAHs in exhaust emission were also influenced by the dispersant in gasoline fuel. The effective quantity of dispersant for decreasing PAHs in exhaust emission is 400 ppm (v/v).

ภาควิชา..... สหสาขาวิชาปิโตรเคมี-โพลีเมอร์

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ลายมือชื่อนิสิต.....

ลายมือชื่ออาจารย์ที่ปรึกษา.....

ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....



ACKNOWLEDGEMENT

The author wishes to express his sincere gratitude to his advisor, Associate Professor Sophon Roengsumran for his helpful advice, and encouragement throughout the research. Especial gratitude is offered to Assistant Professor Amorn Petsom for his valuable guidance, helpfulness, and advice. He is also grateful to Associate Professor Supawan Tantayanon, Assistant Professor Somchai Pengprecha, and Assistant Professor Prapaipit Chamsuksai Ternai for their valuable suggestions and comments.

He wishes to express his appreciation to the Petroleum Authority of Thailand (PTT) and the Metallurgy and Materials Science Research Institute for their kindness in allowing him to use the instruments. Thanks are extended to Miss Wanwiwa Namtip, Miss Jirathiti Tangsuwan, Mr. Opart Septum, Mr. Banjong Marksoong, and everyone who has contributed suggestions, and support during the research.

Finally, he would like to express his greatest appreciation to his family for understanding, heartening, and support during his studies.

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LIST OF ABBREVIATIONS

| | | |
|-----------------|---|--|
| <i>A/F</i> | = | Air-fuel ratio |
| amu | = | Atomic mass unit |
| BaA | = | Benz(<i>a</i>)anthracene |
| BaP | = | Benzo(<i>a</i>)pyrene |
| CFR | = | Cooperative Fuels Research |
| CVS | = | Constant Volume Sampler |
| DHHS | = | The Department of Health and Human Services |
| EI ⁺ | = | Electron Impact Ionization |
| EPA | = | The Environmental Protection Agency of United States |
| GC | = | Gas Chromatography |
| GC-FID | = | Gas Chromatography - Flame Ionization Detection |
| GC-MS | = | Gas chromatography - Mass spectrometry |
| HC | = | Hydrocarbon |
| HPLC | = | High Performance Liquid Chromatography |
| i.d. | = | Internal diameter |
| in | = | Inch |
| LPG | = | Liquefied Petroleum Gas |
| M.W. | = | Molecular Weight |
| <i>m/z</i> | = | Mass to Charge Ratio |

| | | |
|-----------------|---|---|
| MDL | = | Minimal Detection Limit |
| MON | = | Motor Octane Number |
| mph | = | Miles per hour |
| MS | = | Mass Spectrometry |
| NIST | = | Nation Bureau of Standard Library |
| NO _x | = | Oxides of Nitrogen |
| PAH | = | Polycyclic Aromatic Hydrocarbon |
| PAHs | = | Polycyclic Aromatic Hydrocarbons |
| ppm | = | Parts per million |
| RON | = | Research Octane Number |
| rpm | = | Revolution per minute |
| SIM | = | Selected Ion Monitoring |
| SOF | = | Soluble Organic Fraction |
| TESSA | = | Total Exhaust Solvent Scrubbing Apparatus |
| TLC | = | Thin Layer Chromatography |
| UV | = | Ultraviolet Spectrometer |