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จุฬาลงกรณ์มหาวิทยาลัย

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EFFECT OF POLY(PHENYL VINYL KETONE) ON PHOTODEGRADATION OF
HIGH DENSITY POLYETHYLENE FILM

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โพลิฟีนิลไวน์ลคีโตนหรือพีวีเค ซึ่งมีคุณสมบัติเปลี่ยนสถานะคล้ายแก้ว 87-88 องศาเซลเซียสสังเคราะห์ได้จากสารตั้งต้นบีตาไคเมทิลอะมิโนโพรพิโอทีโนนไฮโดรคลอไรด์ โพลิฟีนิลไวน์ลคีโตนที่มีน้ำหนักโมเลกุล 181,000 และ 33,000 นำไปผสมกับแผ่นฟิล์มโพลิเอทิลีนโดยผ่านการอัดรีด แผ่นฟิล์มโพลิเอทิลีนทั้งชนิดที่เติม และไม่เติมโพลิฟีนิลไวน์ลคีโตนนำไปทำการทดสอบการสลายตัวด้วยแสง ทั้งในสภาวะธรรมชาติ และในห้องปฏิบัติการ โดยใช้หลอดไฟฉาบปรอท การสลายตัวด้วยแสงติดตามด้วยการวัดน้ำหนักโมเลกุล และการดูดกลืนแสงอินฟราเรดที่เปลี่ยนแปลงไป จากผลการทดลองพบว่า โพลิฟีนิลไวน์ลคีโตนช่วยเร่งการสลายตัวด้วยแสงของแผ่นฟิล์มโพลิเอทิลีนให้เร็วขึ้น เมื่อพิจารณาในแง่ความเข้มข้นของโพลิฟีนิลไวน์ลคีโตนแล้วพบว่า ค่าความเข้มข้นที่สูงขึ้นจะมีอัตราการสลายตัวด้วยแสงที่เร็วขึ้น แต่น้ำหนักโมเลกุลของโพลิฟีนิลไวน์ลคีโตนไม่มีผลต่ออัตราการสลายตัวของแผ่นฟิล์มโพลิเอทิลีน นอกจากนี้ยังพบว่า เมื่อความหนาของแผ่นฟิล์มโพลิเอทิลีนเพิ่มขึ้น อัตราการสลายตัวด้วยแสงจะช้าลง และได้เสนอกลไกการสลายตัวด้วยแสงของแผ่นฟิล์มโพลิเอทิลีนทั้งชนิดที่เติม และไม่เติมโพลิฟีนิลไวน์ลคีโตน โดยอาศัยผลการทดลองเป็นพื้นฐาน

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ลายมือชื่อนิติต ปวีณา มาริไสว
ลายมือชื่ออาจารย์ที่ปรึกษา ศุภวรรณ ตันตยานนท์
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PAVEENA KHANSAWAI : EFFECT OF POLY(PHENYL VINYL KETONE) ON PHOTODEGRADATION OF HIGH DENSITY POLYETHYLENE FILM. THESIS ADVISOR : ASSOC. PROF. SUPAWAN TANTAYANON, PH.D., ASSOC. PROF. PATTARAPAN PRASASSARAKICH, PH.D., 131 PP. ISBN 974-581-468-7

Poly(phenyl vinyl ketone), PPVK, with glass transition temperature (T_g) 87-88 °C was synthesized by starting from β -dimethylaminopropiophenone hydrochloride. The PPVK with molecular weight of 181,000 and 33,000 were introduced into the HDPE films by extrusion. The HDPE films both with and without PPVK were put to the outdoor exposure and the other set was also irradiated with medium pressure mercury lamp. The progress of photodegradation were followed by molecular weight measurement and fourier transform infrared (FTIR) spectroscopic technique. It was discovered that PPVK accelerated the photodegradation of HDPE. Regarding to the concentration of PPVK, the higher the concentration, the higher the rate of photodegradation was. But different molecular weight of PPVK did not affect on photodegradation rate of HDPE film. Besides, it was found that the thicker the HDPE film, the slower degradation occurred. The photodegradation mechanisms of HDPE films with and without PPVK are proposed on the basis of experimental results.

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ปีการศึกษา 2535

ลายมือชื่อนิสิต
ลายมือชื่ออาจารย์ที่ปรึกษา
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม

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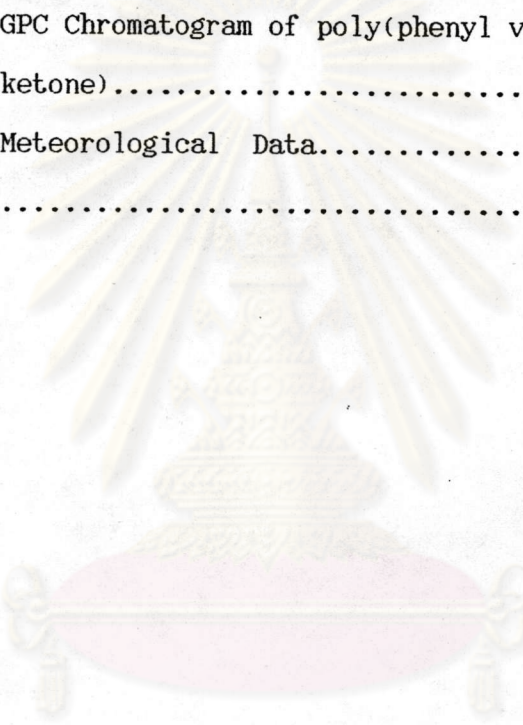
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ABBREVIATIONS

UV	Ultraviolet
IR	Infrared
FTIR	Fourier Transform Infrared
NMR	Nuclear Magnetic Resonance
GPC	Gel Permeation Chromatography
AIBN	Azobis(isobutyronitrile)
THF	tetrahydrofuran
HDPE	high density polyethylene
PVK	phenyl vinyl ketone
PPVK	poly(phenyl vinyl ketone)
MW	molecular weight
Fig.	Figure
Tg	glass transition temperature
ppm	part per million
ν	wavenumber
δ	chemical shift
s	singlet
t	triplet
d	doublet
d.d	doublet of doublets
rpm	round per minute
w/v	weight by volume
v/v	volume by volume
min	minute
ml	millilitre
mm	millimeter
dl	decilitre
g	gram
\AA	angstrom
h	hour