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นายประมวล ทองนิตย์

# ศูนย์วิทยทรัพยากร จุฬาลงกรณ์มหาวิทยาลัย

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SYNTHESIS OF PHOTORESISTIVE NEGATIVE RESIST  
CONTAINING PARA-EPOXYSTYRENE

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ศูนย์วิทยบริการ  
จุฬาลงกรณ์มหาวิทยาลัย

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                        Containing Para-epoxystyrene

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ประมวล ท่องนิตย์ : การสังเคราะห์เนกานิฟรีซิสต์ไวต่อแสงที่มีส่วนประกอบของพาราอีพอก-  
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งานวิจัยนี้ได้ทำการสังเคราะห์เนกานิฟรีซิสต์ไวต่อแสงที่มีส่วนประกอบของพาราอีพอกซีสไครvin ในไบโอนิคอล โดยทำการสังเคราะห์พอลิพาราอีพอกซ์ไสไครvin และพอลิพาราอีพอกซ์ซีสไครvin โคลสไครvin สำหรับไบโอนิคอลสังเคราะห์ที่นำมา ๕ ตัว ซึ่งขึ้นตอนในการสังเคราะห์นั้นยังไม่เคยมีผู้ให้ใช้สังเคราะห์มาก่อน ประกอบด้วย ๕ ขั้นตอนหลัก ๆ ดังต่อไปนี้ เริ่มต้นจากการทำคลอโรเมทิเลทันของ ๒-พินิลเอทิล-ไมรีโน๊ต ปฏิกิริยานี้ทำให้ได้ พารา ๒-ไมรีโนเอทิลเมธิลคลอโรต์ เมื่อนำมาทำตัวไครโนมิเนชัน ให้พาราคลอโรเมทิลสไครvin ซึ่งเป็นในในเมอร์สำหรับการสังเคราะห์พอลิเมอร์ คือพอลิพาราคลอโรเมทิล-สไครvin และพอลิพาราคลอโรเมทิลสไครvin หลังจากนั้นหมุนเมทิลคลอโรต์ ให้ถูกเปลี่ยนเป็นหมุน พาราคลอโรเมทิล และหมุนคิวคลอกิจตามลำดับ การพิสูจน์ยุติธรรมสว่างของสารที่สังเคราะห์ให้ในแต่ละ ขั้นตอนทำได้โดยใช้เทคนิคทางสเปกโทรสโคปี เช่น อินฟราเรด ไฟฟอน และคาร์บอน-13 นิวเคลียร์- แมกนีติกเรโซนเนนซ์ และ แม่สสสเปกโทรสโคปี เป็นต้น

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ภาควิชา ..... สหศึกษาปีตรиемี-โพลิเมอร์  
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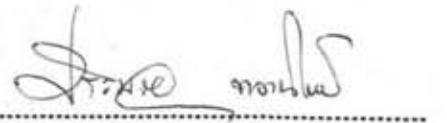
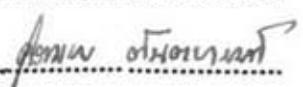
อาจารย์ชื่อที่อนุมัติ .....   
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ลายมือชื่ออาจารย์ที่ปรึกษา .....

PRAMUEL THONGNIT : SYNTHESIS OF PHOTO SENSITIVE NEGATIVE RESIST  
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The photosensitive negative resists containing p-epoxystyrene were synthesized. They were poly(p-epoxystyrene) and poly(p-epoxystyrene-co-styrene). In case of copolymers, 5 composition ratios of the two monomers were attempted. The route used for synthesizing these compounds is novel. There were five successive reactions. Firstly, chloromethylation of 2-phenylethyl bromide to give p-(2-bromoethyl)benzyl chloride was carried out. Subsequently, it was dehydrobromination to p-chloromethylstyrene which was the monomer used for preparing poly(p-chloromethylstyrene) and poly(p-chloromethylstyrene-co-styrene). Then conversion of the chloromethyl group to the carboxaldehyde group was performed and, finally, the carboxaldehyde group underwent epoxidation to form the epoxide group. All the synthesized compounds were characterized by the spectroscopic techniques : IR, <sup>1</sup>H NMR, <sup>13</sup>C NMR and Mass spectroscopy; etc.

## ศูนย์วิทยทรัพยากร จุฬาลงกรณ์มหาวิทยาลัย

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 ลายมือชื่ออาจารย์ที่ปรึกษา   
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## ABBREVIATIONS

EA	ethylacrylate
GMA	glycidylmethacrylate
GA	glycidylacrylate
PDOP	poly(diallylorthophthalate)
CMPS	chloromethylated polystyrene
PCMS	poly(chloromethylstyrene)
PVK	poly(vinyl - carbazole)
PMMA	poly(methyl methacrylate)
PVA	polyvinyl alcohol
UV	ultraviolet
D	incident dose
I	beam current
S	exposed area
DMSO	dimethylsulfoxide
AIBN	Azobis(isobutyronitrile)
NMR	Nuclear Magnetic Resonance
IR	Infrared
GC	Gas chromatography
GPC	Gel permeation chromatography
HPLC	High Performance Liquid Chromatography
C	Coulombs
J	Joule
γ	contrast
cm <sup>2</sup>	square centimeter
μm	micrometer
°A	Angstrom
Fig	Figure
KeV	Kiloelectron volt
q	charge on electron

## ABBREVIATIONS (continued)

$\rho$	density of the polymer
ppm	part per million
$\delta$	Chemical shift.
$\lambda$	wavelength absorption
$z$	thickness of the film
E	energy absorbed in the resist layer
$M_w$	weight average molecular weight of the polymer
$G(x)$	number of crosslinks produced per 100 eV of absorbed
N	Avogadro's number
$\phi$	The quantum yield
$T_{irrad}$	incident irradiation time
$\mu/\rho$	mass absorption coefficient at a given wavelength
$M^+$	molecular peak
t	triplet
s	singlet
d	doublet
d.d	doublet of doublets
rpm	round per minute
sec.	second
min.	minute
$T_g$	glass transition temperature
p	polymer
psi	pound per square inch
$R_t$	Retention time
$R_v$	Retention volume