

SYNTHESIS OF A NEW THERMOCHROMIC LIQUID  
CRYSTAL MONOMER

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**By**

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the requirement for the Degree of  
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**PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK PENYELIDIKAN I  
DAN II**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

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## LIST OF ABBREVIATIONS

PLCs	-	polymeric liquid crystals
LCDs	-	liquid crystal displays
NMR	-	nuclear magnetic resonance
LCs	-	liquid crystals
DSC	-	differential scanning calorimeter
nm	-	nanometer
KBr	-	potassium bromide
TGA	-	thermo gravimetric analysis
TLC	-	thin layer chromatography
R <sub>f</sub>	-	retardation factor
cm. <sub>1</sub>	-	per centimeter
NaCl	-	sodium chloride
g/mol	-	gram per mol
m/z	-	mass per charge

## LIST OF SYMBOLS

$^1\text{H}$	-	hydrogen
$^{\circ}\text{C}$	-	degree Celcius
$\pi$	-	pai
$\nu$	-	stretching
$\delta$	-	bending
vs	-	very strong
s	-	strong
m	-	medium
w	-	weak

## ABSTRACT

Liquid crystals phase is an intermediate phase of matter which is observed between crystalline solid phase and isotropic liquid phase in some substances. This research is focused on synthesizing and characterizing the structure of new thermotropic liquid crystal monomer. In this study, three precursors were used in order to synthesis liquid crystal structure which are A-Phenol (2,2-Bis (4-hydroxyphenyl) propane) as the mesogenic group, 3-chloro-1-propanol as the spacer linkage and allyl chloride as the polymer backbone. Spectroscopy and chromatography analysis were conducted for conformation of the product obtained. However, mass spectroscopy analysis revealed that the product obtained was not a liquid crystal monomer due to different  $m/z$  value.



## ABSTRAK

Fasa hablur-cecair adalah fasa perantaraan yang telah dikenalpasti wujud di antara fasa pepejal kristal dan fasa cecair isotropik bagi beberapa jenis sebatian. Kajian ini memfokuskan kepada penghasilan dan pencirian struktur monomer hablur-cecair termotropik yang baru. Dalam penyelidikan ini, tiga bahan awal digunakan untuk mensintesis molekul hablur-cecair iaitu A-Phenol (2,2-Bis (4-hydroxyphenyl) propane) sebagai kumpulan mesogen, 3-kloro-1-propanol sebagai peruang sambungan dan alil klorida sebagai tulang belakang polimer. Analisis spektroskopi dan kromatografi dijalankan untuk pengenalpastian hasil yang diperolehi. Namun begitu, analisis spektroskopi jisim menunjukkan bahawa hasil yang diperolehi bukanlah monomer hablur-kristal berdasarkan kepada nilai  $m/z$  yang berbeza.