

## BLUE LIGHT EMITTING MONOMER



Shifa Majid Hajite

D.G. Tatkare Mahavidyalay, Mangaon, Raigad.

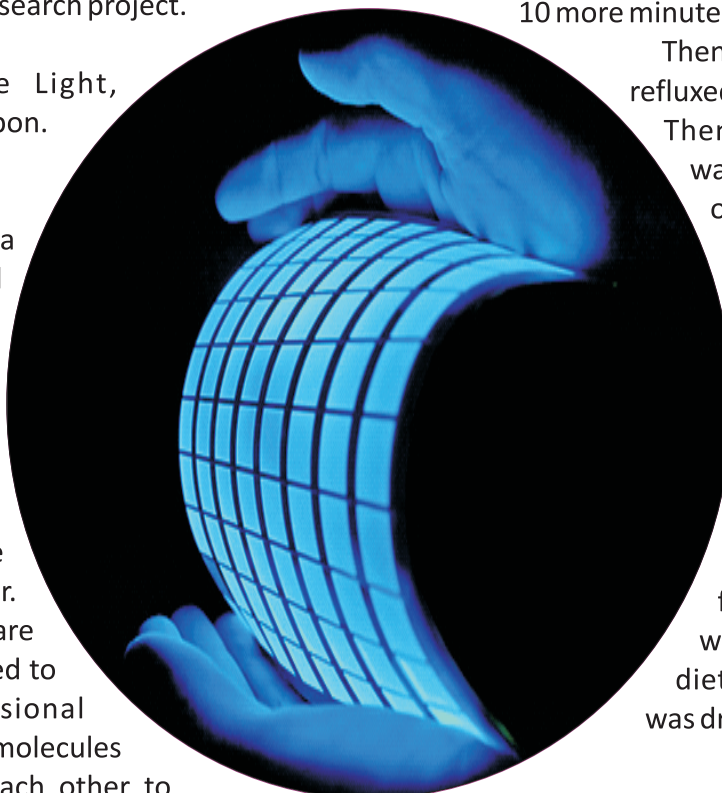
### ABSTRACT:

**P**olyacenes belong to a class of polycyclic aromatic hydrocarbon (PAH) compounds which are planar sets of linearly fused benzene rings with the general formula  $C_{4n+2}H_{2n+4}$  or  $C_2H_4(C_6H_4)_m$ . Among several polyacenes anthracene is one of the polycyclic aromatic hydrocarbon which exhibit interesting properties and has wide applications. Thus designed and synthesis of highly stable and luminescent-form of derivative of anthracene is the main aim of this research project.

**KEYWORDS :** Blue Light, Polyacenes, hydrocarbon.

### INTRODUCTION :

A polymer is a substance composed of molecules with large molecular mass consisting of repeating units connected by covalent chemical bonds. In some cases the repeating unit is linear. In other cases chains are branched or connected to form three dimensional networks. The small molecules that combine with each other to form polymer molecules are termed as monomers. Polymers can be both natural and synthetic.



### General procedure of synthesis of 9, 10-di (p-methoxy phenyl) anthracene (DPA):

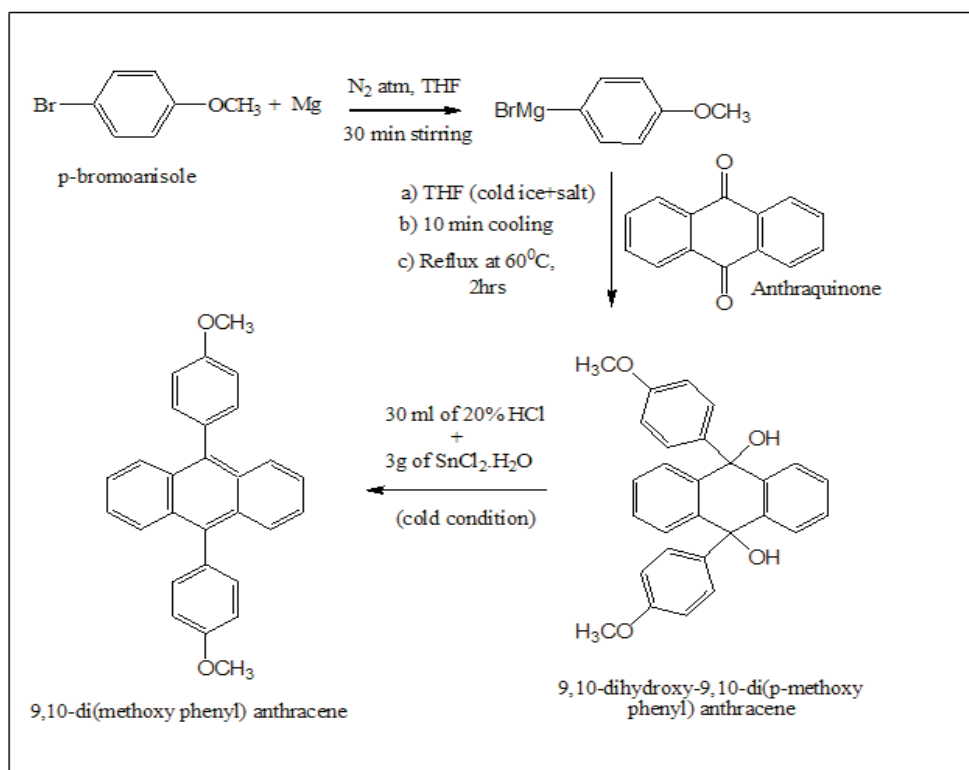
A solution of 1mmol of p-bromo anisole in THF is added to nitrogen plunged solution of Mg powder (1mmol) in THF at 0-5°C temperature (salt + ice) to synthesize Grignard reagent. The mixture was stirred for 30 minutes.

The suspension of anthraquinone (0.1mmol) in 20ml THF was added drop by drop in a well cooled condition of ice and salt. After completion of addition, cooling was continued for 10 more minutes.

Then reaction mixture was refluxed at 60°C for 2 hours.

Then reaction mixture was cooled and mixture of 30ml of 20% HCl and 3g of  $SnCl_2 \cdot H_2O$  was added drop wise. After the addition, reaction mixture was heated to 60°C with additional 1 hour with stirring.

The precipitate obtained was filtered, washed with water, ethanol and diethyl ether. Product was dried in vacuum.



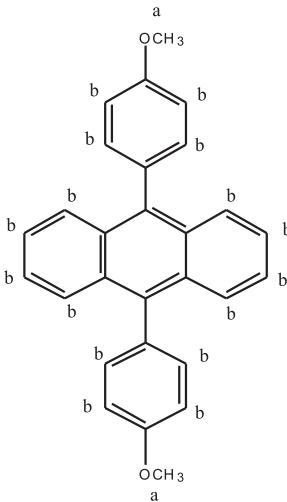
**Reaction scheme :-** General procedure of synthesis of 9, 10-di (p-methoxy phenyl) anthracene

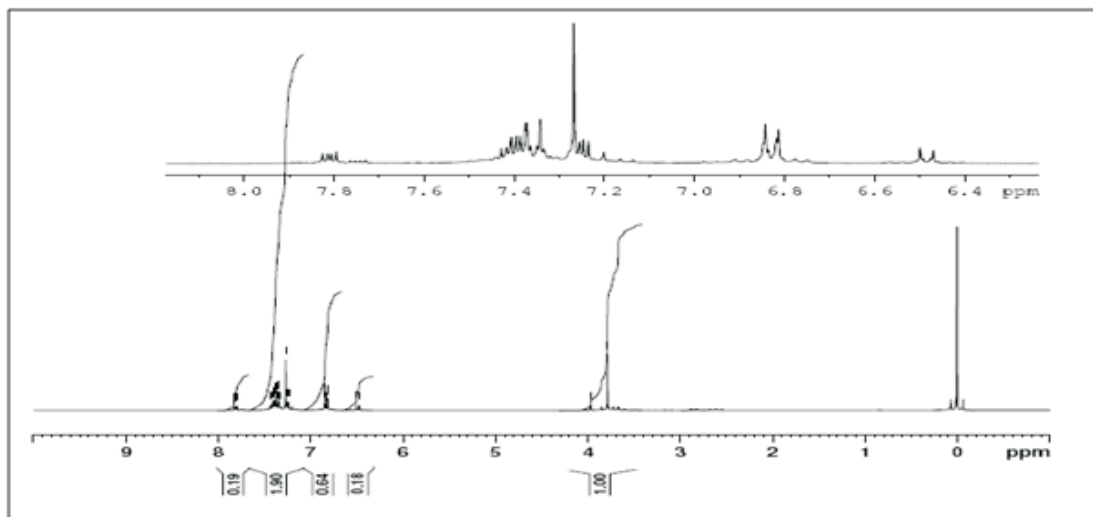
Molecular formula	:	C <sub>28</sub> H <sub>22</sub> O <sub>2</sub>
Molecular weight	:	390
Weight of crystalline product	:	1.246g
Melting point	:	185 <sup>0</sup> C
Percentage yield	:	66%

### Structure Confirmation By Nuclear Magnetic Resonance Spectroscopy (NMR):

The  $^1\text{H}$  NMR spectra were recorded on a Bruker AMX-300 spectrometer in  $\text{CDCl}_3/\text{DMSO}$  and chemical shifts were reported in  $\delta$  ppm. The tetra methyl silane (TMS) was used as an internal standard. The signals were obtained in the range 1.00-8.50  $\delta$  ppm. The spectral data of the compounds are summarized in the following tables according to their signals and respective  $\delta$  ppm values. The signals assigned in the tables were compared with the spectral data for the similar compounds reported in literature.

Table : NMR Spectral Data of 9, 10-di (p-methoxy phenyl) anthracene (DPA):

Signals	Nature of signal	$\delta$ ppm	Assignment	Structure
a	Singlet	3.972	6H, - OCH <sub>3</sub>	
b	Multiplet	6.470-7.806	16H, Ar-H	



NMR Spectra of 9, 10- di (p-methoxy phenyl) anthracene (DPA)

### Fluorescence Spectroscopy:

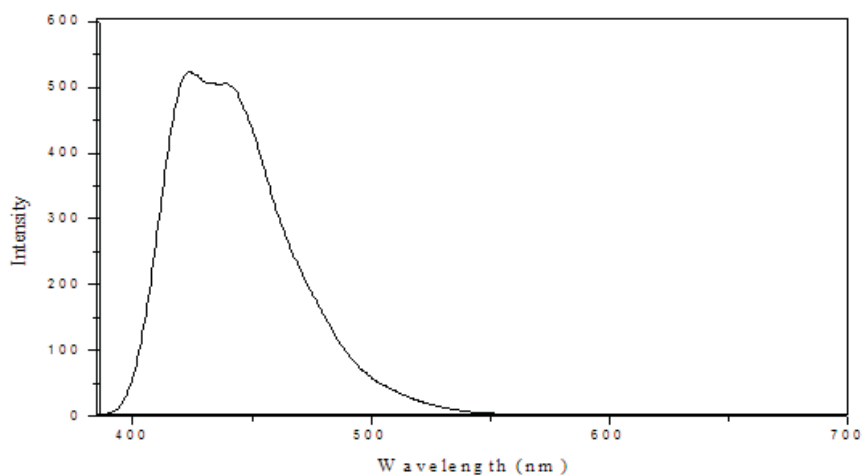
Photoluminescence (PL) is a kind of luminescence, excited by irradiation of a substance with light. The light hitting a sample puts atoms, ions or molecules in the sample into excited states (by absorption of photons), from where they decay into lower-lying states (e.g. their ground states) through spontaneous emission of fluorescence photons. The resulting radiation is called *fluorescent light*.

This phenomenon occurs in various kinds of optically pumped lasers and amplifiers, e.g. in solid-state doped-insulator lasers and amplifiers (including fiber lasers and fiber amplifiers), in optically

pumped semiconductor lasers, and in dye lasers.

#### Fluorescence data for monomers

Compounds	Intensity	Wavelength (nm)	E <sub>g</sub> Band gap (eV)	Emission
DPA	523.42	423	2.93	Blue



Emission Spectra of 9, 10- di (p-methoxy phenyl) anthracene (DPA)

#### CONCLUSIONS:

- 1) The result of the work carried out showed that derivatives of blue light emitting diphenyl anthracene can be used as monomer for preparation of light emitting polymers.
- 2) Monomer is easily soluble in organic solvents like DMSO, CDCl<sub>3</sub>, and THF as well as soluble in common organic solvents.
- 3) The photoluminescence spectra recorded in chloroform showed blue light emission in the photoluminescence process.

#### REFERENCES:

- [1] A. Bernanose, M. Comte, P. Vouaux, *J. Chim. Phys.*, 50, 64 (1957).
- [2] Tang CW, Vanslyke SA., *App. Phys. Lett.*, 51, 913 (1987).
- [3] Burroughes JH, Bradley DDC, Brown AR, Mackay RN, Friend RH, Burns P.L., Holmes A.B., *Nature* 347,539 (1990)
- [4] Pope, M.; Kallmann, H. P.; Magnante, P. *The Journal of Chemical Physics.*, 38 (8): 2042 (1963).