11th International Conference on Advanced Materials
Rio de Janeiro Brazil
September 20 - 25
ICAM 2009

Study of charge carriers mobility in poly (9, 9-dioctylfluorenyl-2, 7-diy) capped with N, N-Bis (4-methylphenyl)-4-aniline (PFO).

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Light-emitting conjugated polymers are being developed for use in organic light emitting diodes (OLED), with end applications in flat panel displays and solid-state lighting [1], there has been a great amount of research conducted in this area [2]. The main goal of this research is to determine the mobility of charge carriers in this device. In this work, we propose a study to evaluate the mobility of charge carriers in a new polymer *poly (9, 9-dioctylfluorenyl-2, 7-diy)* capped with *N, N-Bis (4-methylphenyl)-4-aniline*. It's also called **PFO**. Despite their importance and all the acquired knowledge in the last years, the charge transport mechanisms are still not fully understood. A detailed description of the states and charge carrier mobility requires many efforts due to difficulties found in conventional techniques such as Time-of-Flight (ToF) and due to the small thickness of the films [3, 4]. In this context, our objective is to apply a new and powerful technique, Charge Extraction in a Linearly Increasing Voltage (CELIV) [5,6], to determine charge carrier mobility in sandwiched structures where the active layer thickness is in the order of hundreds of nanometers. The validity of the results will be demonstrated by comparing them to more conventional techniques, such as ToF, Dark Injection in Space Charge Limited Current (DI-SCLC) and Current density versus Voltage (J vs. V) measurements, reaching the minimum thickness where other techniques fail to work.

Samples are processed on indium tin oxide (ITO)-coated glass substrates Figure. 1a. Prior to organic thin-film deposition by casting or spin coating, ITO is etched in chloridric acid and cleaned under standard solvents. After stirring the semiconductor solution, PFO in toluene is deposited and dried at 55ºC. Samples are then loaded into a thermal evaporator for aluminum (Al) deposition. The deposition of the polymer is done inside a glove box in inert atmosphere. A schematic drawing of the ToF method is showed in Figure 1b, it is illustrated in Figure 1c the basic idea of the method CELIV and in the Figure 1d method DI-SCLC.

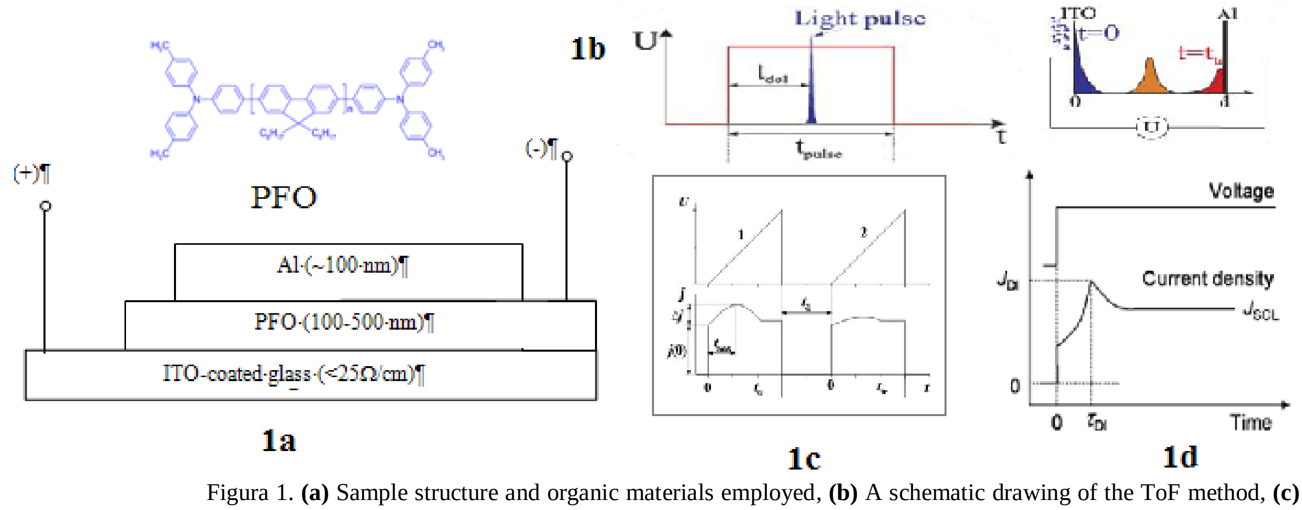

Figura 1. **(a)** Sample structure and organic materials employed, **(b)** A schematic drawing of the ToF method, **(c)** the basic idea of the method CELIV and (d) figure illustrative of the DI-SCLC method.

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