

Effects of chemical modifications on optical, morphological, and electrical properties of spin-coated PPV derivatives films

*Maha Benzarti-Ghédira^a, Nejmeddine Jaballah^b, Rafik Ben Chaâbane^a,
Mustapha Majdoubb and Hafedh Ben Ouada^a*

^aLaboratoire de Physique et Chimie des Interfaces (LPCI),

Faculté des Sciences de Monastir, Bd de l'environnement, 5019 Monastir, Tunisia

^bLaboratoire des Polymères, Biopolymères et Matériaux Organiques (LPBMO),

Faculté des Sciences de Monastir, 5019 Monastir, Tunisia

E-mail : rafik.benchaabane@fsm.rnu.tn

Abstract:

Organic semi-conducting polymers have attracted considerable attention in light-emitting devices (OLEDs). We report here the opto-electronic properties of an organic diode based on new blue-photoluminescent PPV derivative (BPAF-PPV): [ITO/BPAF-PPV /Al].

The optical gap of BPAF-PPV, estimated from the absorption of the film, was about 3.02 eV. The structure was investigated by current-voltage and impedance spectroscopy measurements. The static electrical characterisation show a space charge limited conduction (SCLC). The study of conductivity versus frequency shows a typical behaviour of a hopping transport in disordered materials. The impedance spectra can be discussed in terms of an equivalent circuit model designed as a network formed of a parallel resistor (RP) and capacitor (CP) in series with resistor (RS). We extract numerical values of these parameters by fitting experimental data. Their evolution with bias voltages has shown that the SCLC mechanism is characterised by an exponential trap distribution. Finally, the change in electrical behavior is correlated to the chemical modification done.