Abstract

In the interest of the synthesis of polymers that have the potential to possess inherent light-emitting properties (LEDs) the synthesis of a novel 1,4-bis(chloromethyl)-benzene monomer, 5-benzyloxy-1,4-dichloromethyl-2,3-diphenyl benzene 78 was carried out. Monomer 78 was polymerized via the Gilch polymerization method to yield, poly(5-benzyloxy-2,3-diphenyl phenylene vinylene) 80. Polymer 80 was characterized by TGA (5% weight loss at 267°), GPC (weight average molecular weight of 7136 Da, number average molecular weight of 6603 Da), UV-Vis and fluorescence studies (absorbance maximum at 406 nm, emission maximum at 510 nm).

The Horner-Wadsworth-Emmons variant of the Wittig was applied in the synthesis of poly(2,3-diphenyl-1,4-phenylenevinylene) (DP-PPV) 3 from 2,3-diphenylterephthalaldehyde 6 and 1,4-bis(diethoxyphosphorylmethyl)-2,3-diphenyl benzene 79, which was synthesized via the Michaelis-Arbuzov reaction. Four trials were carried out to determine an optimal method for the order of addition of the monomers and base. Of these, trial 4, which yielded polymer 3d, was found to the most optimal. Polymer 3d was characterized by TGA (5% weight loss of 319°), UV-Vis and fluorescence studies (absorbance maximum at 430 nm, emission maximum at 496 nm when excited at 416 or 424 nm).