



Contribution ID: 64

Type: Poster

Synthesis of poly (p-Phenylene ethynylene)s using Palladium Supported on Calcium Carbonate as Heterogeneous Catalyst

Our research focuses on the development of the synthesis of poly(*p*-phenylene ethynylene)s, PPEs via the Sonogashira coupling reaction using palladium supported on calcium carbonate as heterogeneous catalyst. We screened different palladium catalysts, bases and solvent to determine the optimal condition. The optimized study reveals that the use of Pd/CaCO₃ in diisopropylamine as a base in dimethylformamide as a solvent at 80 °C give the PPE in good yield after precipitation with methanol. The Gel Permeation Chromatography (GPC) data indicates that an average molecular weight (Mw) is 24,185 while degree of polymerization (DP) and polydispersity index (PDI) are 53 and 2.7, respectively. Inductively coupled plasma optical emission spectrometer (ICP-OES) measurement reveals that leaching of palladium into PPEs are only 0.3% w/w. When compare these data with the conventional homogeneous catalyst, PdCl₂ (PPh₃)₂, it indicates that our PPEs show better properties in term of DP, PDI and contamination of palladium. This finding provides the new method to prepare the high purity PPE for the optoelectronic material.

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Track Classification: Environmental nanotechnology