Supporting Information

Scalable Fabrication of Electrochromic Films Using a Cobalt-Complexed Poly(*N*-vinylcarbazole) Metallopolymer

Arockiam Jesin Beneto[1] and Minjun Kim[2,*]

[1]Department of Chemical Engineering, Pohang University of Science and Technology (POSTECH), Pohang, Gyeongbuk 37673, Republic of Korea
[2]Department of Chemistry, Kyonggi University, Suwon 16227, Republic of Korea

Synthesis of 3-([2,2':6',2''-terpyridin]-4'-yl)-9-vinyl-9H-carbazole (3)

Compound 2 0.5 g (1.75 mmol) was dissolved in 10 ml of ethanol in a two neck round bottom flask and then added 2-actylpyridine 0.63 mL (10.5 mmol) and potassium hydroxide 0.34 g (6.1 mmol). The reaction mixture was heated to 60 ºC for 1 hour and then added ammonium hydroxide NH_4OH 5 ml and then continued for 10 hr. The precipitated product was collected by filtration and washed with ethanol. The product was dried under vacuum and obtained as a white powder (0.35 g; yield 42%). The product was confirmed by ^{1}H-NMR: ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.86 (s, 2H), 8.80 – 8.68 (m, 4H), 8.63 (d, *J* = 1.5 Hz, 1H), 8.21 (d, *J* = 7.6 Hz, 1H), 8.05 (dd, *J* = 8.6, 1.8 Hz, 1H), 7.90 (td, *J* = 7.8, 1.7 Hz, 2H), 7.73 (dd, *J* = 29.0, 8.4 Hz, 2H), 7.57 – 7.47 (m, 1H), 7.41 – 7.30 (m, 4H), 5.62 (dd, *J* = 15.9, 0.8 Hz, 1H), 5.25 (d, *J* = 9.1 Hz, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 156.50, 155.80, 150.79, 149.11, 139.91, 136.87, 130.99, 129.41, 126.62, 125.83, 124.61, 123.93, 123.69, 121.41, 120.96, 120.57, 119.22, 118.82, 110.77, 110.63, 102.92.

Synthesis of PVK-3-tpy

0.1 g (0.23 mmol) of compound 3 was dissolved in 5 mL of dry tetrahydrofuran (THF) under argon atmosphere and added azobisisobutyronitrile (AIBN) 0.01 g and then heated to 60 ºC and continued for 12 h. After that the reaction mixture was concentrated by evaporating the excess solvent and then precipitated by adding dropwise into methanol. The precipitated solid was collected by filtration and dried under vacuum. The ^{1}H-NMR study confirms that the absence of vinyl bond in the polymer product indicated the polymerized product was obtained.

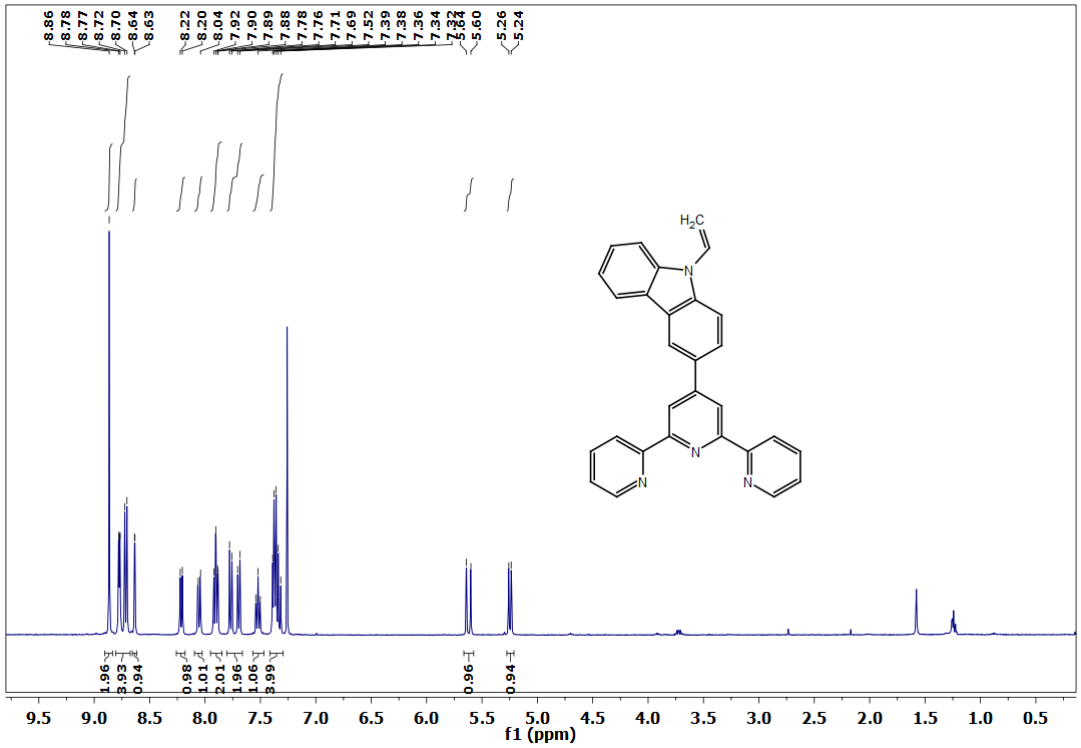

Figure S1. ^{1}H-NMR spectrum of compound **3**.

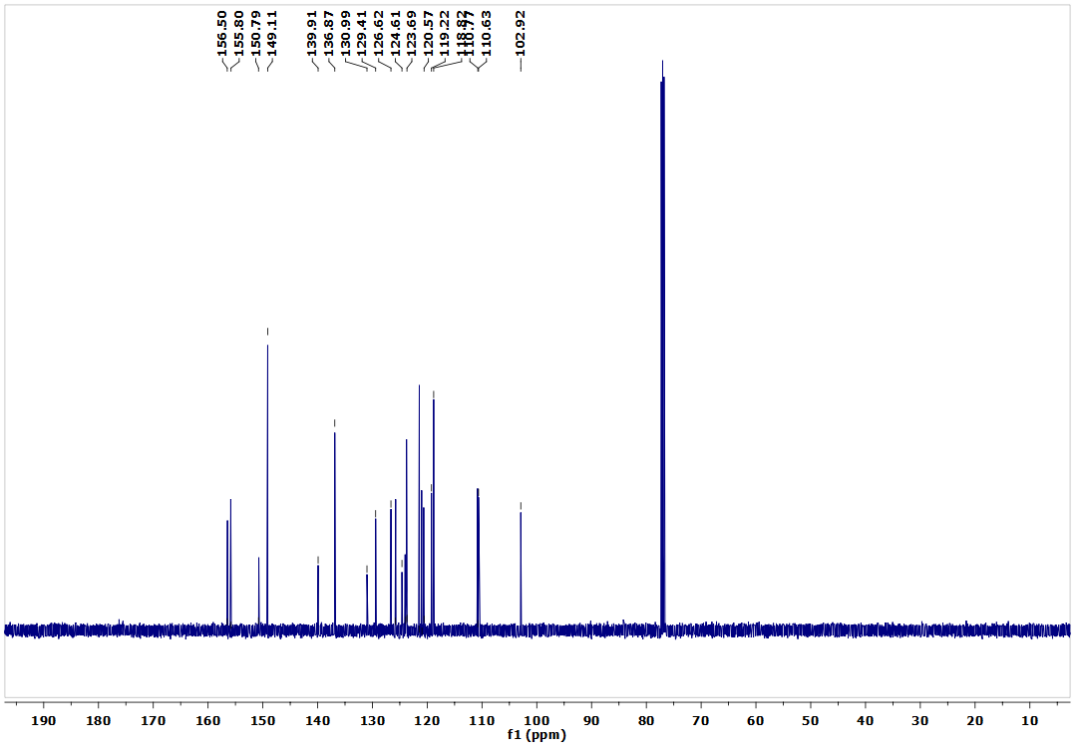

Figure S2. ^{13}C-NMR spectrum of compound **3**.