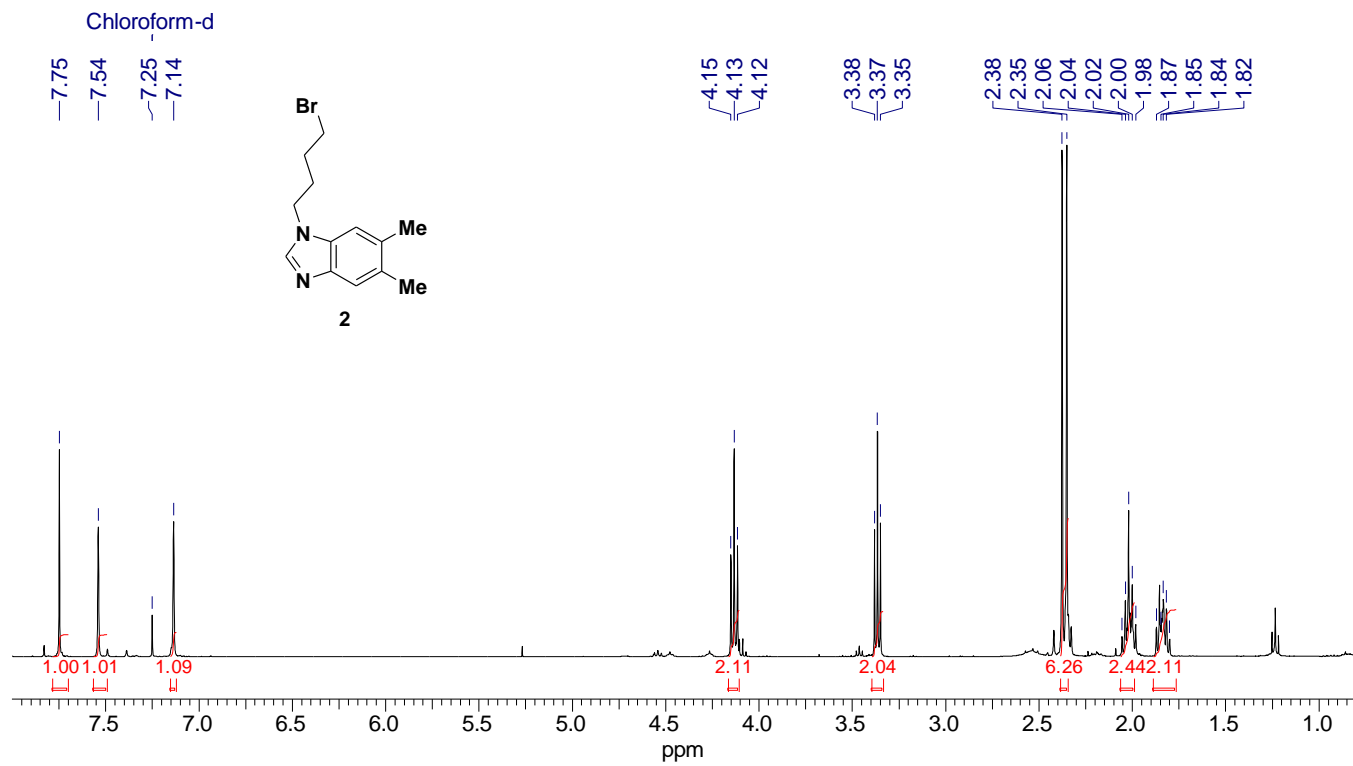


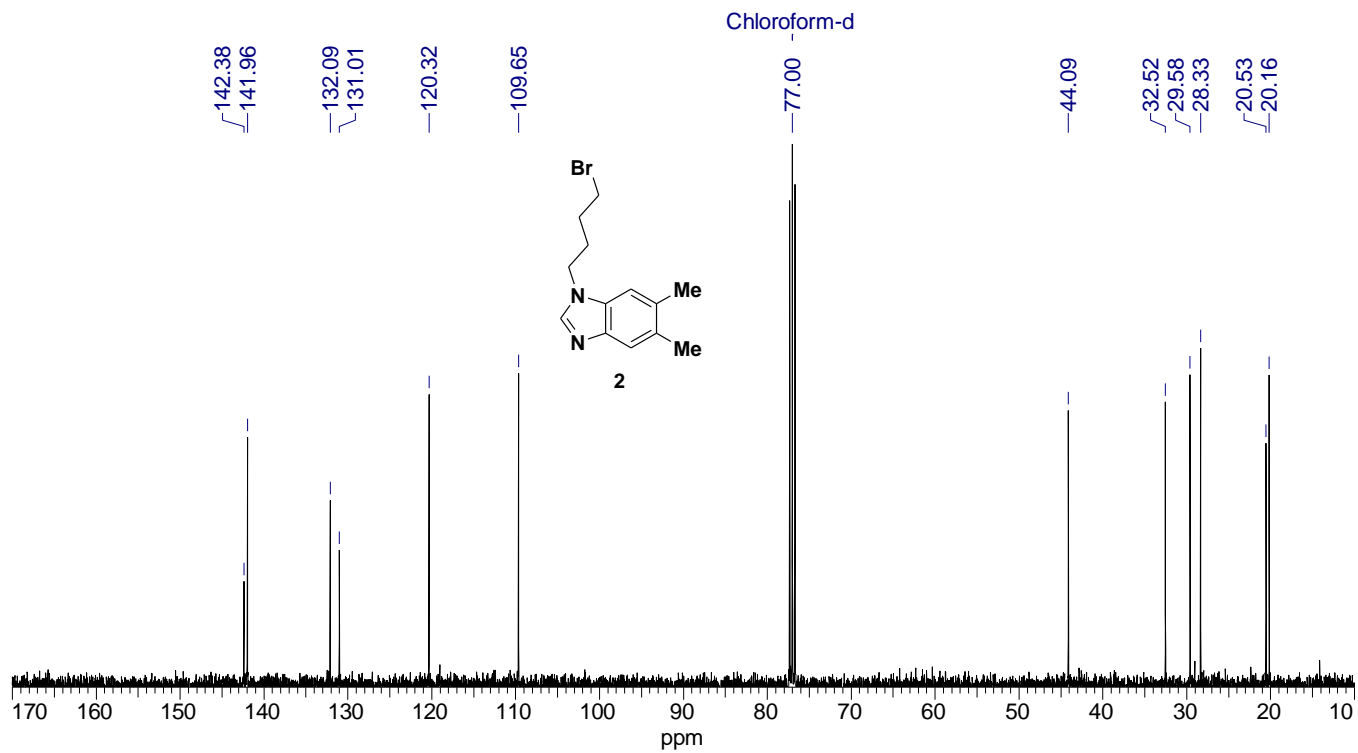
**A novel 1,1'-bis[4-(5,6-dimethyl-1*H*-benzimidazole-1-yl)butyl]-4,4'-bipyridinium dibromide
(viologen) for a high contrast electrochromic device**

Supporting Information

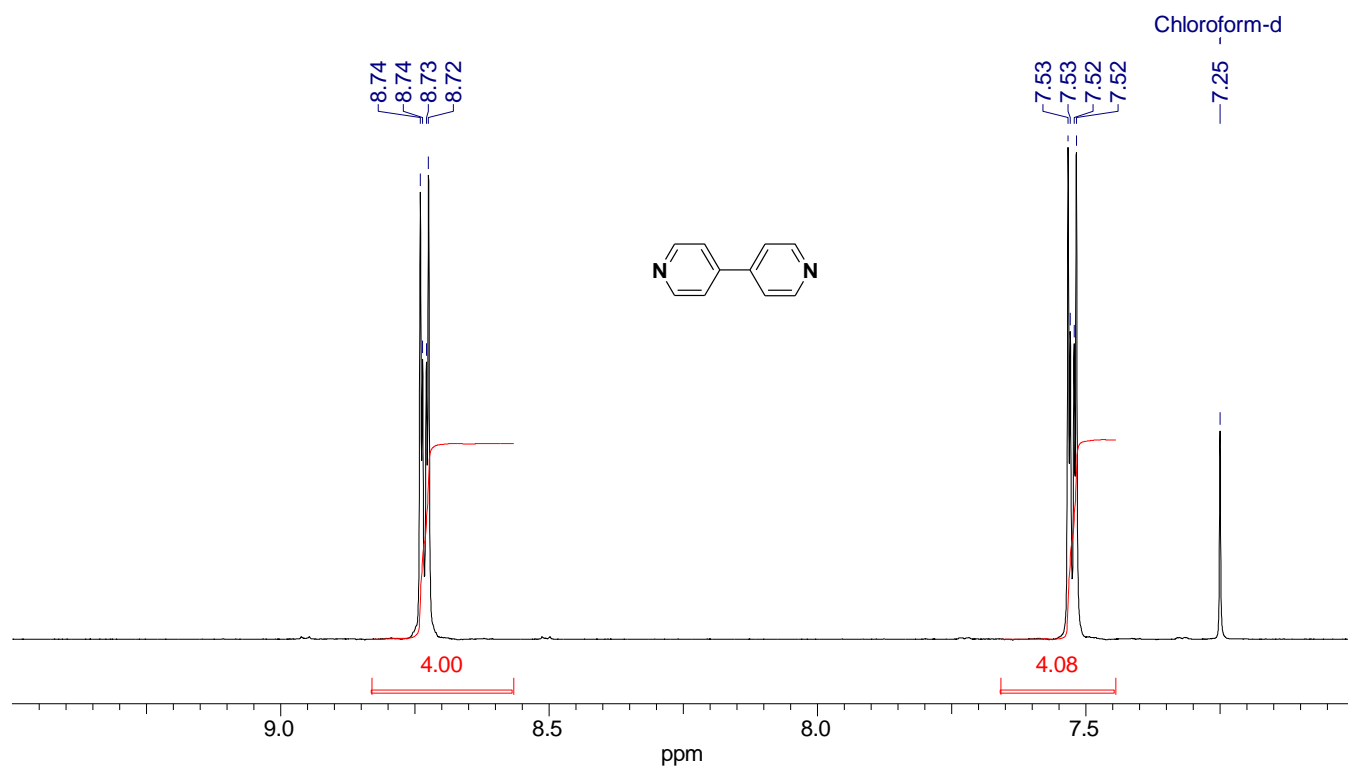
General: IR spectra were recorded on a Bruker Tensor 37 (FTIR) spectrophotometer. ¹H NMR spectra were recorded on a BrukerAvance 400 (400 MHz) spectrometer at 295 K in CDCl₃ or CD₃OD; chemical shifts (δ ppm) are reported in standard fashion with reference to either internal standard tetramethylsilane (TMS) ($\delta_{\text{H}} = 0.00$ ppm) or CHCl₃ ($\delta_{\text{H}} = 7.25$ ppm). ¹³C NMR spectra were recorded on a BrukerAvance 400 (100 MHz) spectrometer at RT in CDCl₃ or CD₃OD; chemical shifts (δ ppm) are reported relative to CHCl₃ [$\delta_{\text{C}} = 77.00$ ppm (central line of triplet)]. In the ¹³C NMR, the nature of carbons (C, CH, CH₂ and CH₃) was determined by recording the DEPT-135 spectra, and is given in parentheses and noted as s = singlet (for C), d = doublet (for CH), t = triplet (for CH₂) and q = quartet (for CH₃). In the ¹H-NMR, the following abbreviations were used throughout: s = singlet, d = doublet, t = triplet, q = quartet, qui = quintet, m = multiplet and br s. = broad singlet. The assignment of signals was confirmed by ¹H, ¹³C CPD and DEPT spectra. High-resolution mass spectra (HR-MS) were recorded using Agilent6538 UHD Q-TOF using multimode source, JEOL instrument (EI and FAB) or a Bruker Apex Qe instrument (ESI) and HRMS (FT-ICR): Bruker Daltonic APEX 2 with electron spray ionization (ESI). Reactions were monitored by TLC on silica gel using a combination of petroleum ether and ethyl acetate and dichloromethane as eluents. Solvents were distilled prior to use; petroleum ether with a boiling range of 60 to 80 °C was used. Acme's silica gel (60 – 120 mesh) was used for column chromatography (approximately 20 g per one gram of crude material).



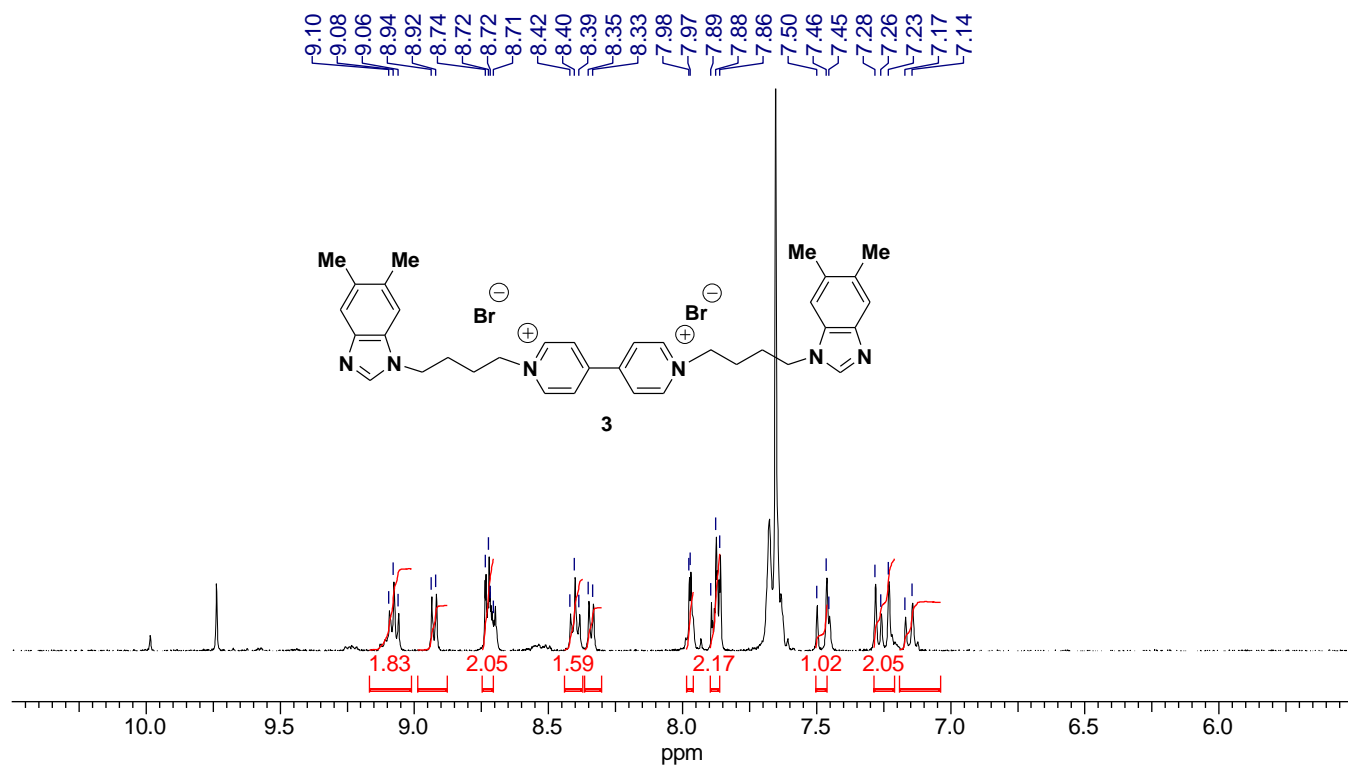
^1H NMR (400 MHz) spectrum of **2** in CDCl_3 .



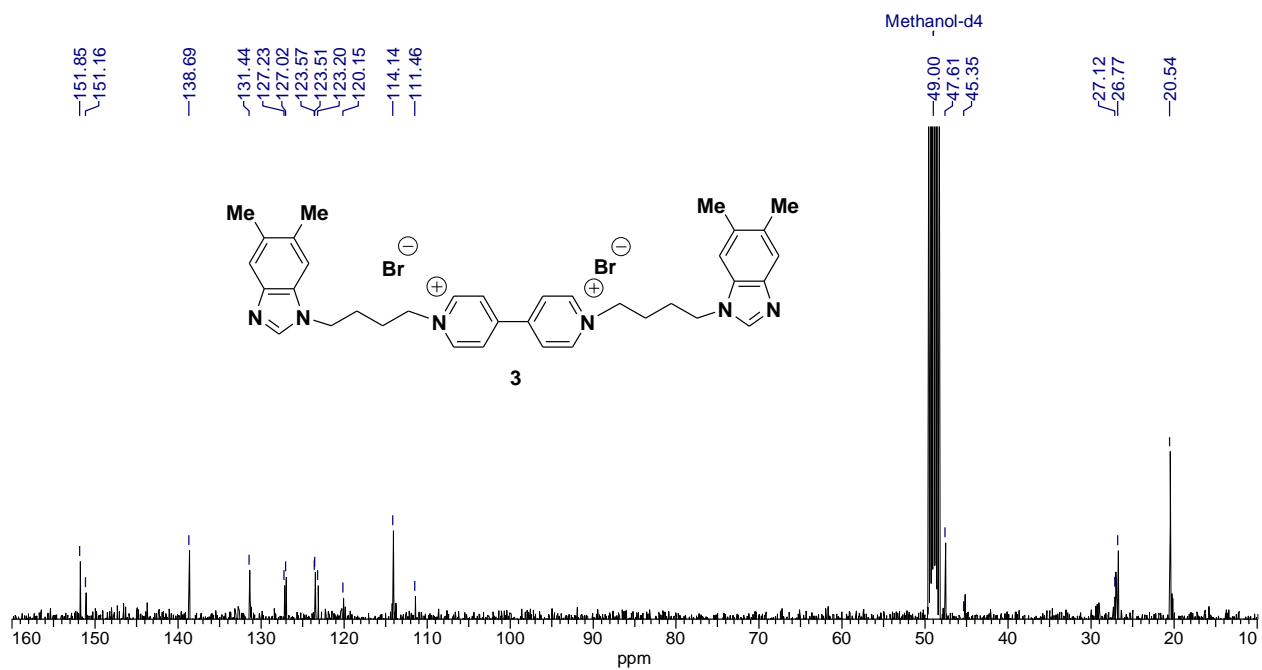
^{13}C NMR (100 MHz) spectrum of **2** in CDCl_3 .



^1H NMR (400 MHz) spectrum of 4,4'-bipyridyl in CDCl_3 .



¹H NMR (400 MHz) spectrum of **3** in CD₃OD.



¹³C NMR (100 MHz) spectrum of **3** in CD₃OD.