Supplementary Information

Detection of water in organic solvents by photo-induced electron transfer method

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Experimental Section:

General: IR spectra were recorded on a Perkin Elmer Spectrum One FT-IR spectrometer by ATR method. Absorption spectra were observed with a Shimadzu UV-3150 spectrophotometer and fluorescence spectra were measured with a Hitachi F-4500 spectrophotometer. Mass spectral data were acquired on a JEOL double-focusing mass spectrometer SX102A equipped with a FAB inlet system. ¹H NMR spectra were recorded on a JNM-LA-400 (400 MHz) FT NMR spectrometer with tetramethylsilane as an internal standard. Column chromatography was performed on silica gel (KANTO CHEMICAL, 60N, spherical, neutral). The determination of water in 1,4-dioxane, THF, acetonitrile and ethanol solution was done with a MKC-610 and MKA-610 Karl Fischer moisture titrator (Kyoto Electronics manufucturing Co., Ltd.) based on Karl Fischer coulometric titration for below 1.0 wt% and volumetric titration for above 1.0 wt%, respectively.

Preparation of 4-(anthracen-9-ylmethyl-methyl-amino)-butyric acid ethyl ester (1)

A solution of 9-(methylaminomrthyl)anthracene (2.0 g, 9.04 mmol) in acetonitrile (70 ml) was treated with sodium hydride (60%, 1.45 g, 36.2 mmol) and stirred for 1 h at room temperature. Ethyl 4-bromobutyrate (8.81 g, 45.2 mmol) was added dropwise over 20 min and the solution was stirred at room temperature for 1 h. After concentrating under reduced pressure, the resulting residue was dissolved in dichloromethane, and washed with water. The residue was chromatographed on silica gel (dichloromethane–ethyl acetate = 3 : 1 as eluent) to give **1** (0.9 g, yield 30 %) as a yellow oil; IR (ATR): $\tilde{v} = 1728 \text{ cm}^{-1}$; ¹H NMR (acetone-d₆, TMS) $\delta = 1.12$ (3H, t), 1.77–1.82 (2H, m), 2.20–2.23 (5H, m), 2.59 (2H, t), 3.92–3.97 (2H, m), 4.56 (2H, s), 7.47–7.55 (4H, m), 8.06 (2H, d, J = 7.80 Hz), 8.54 (3H, t); EIMS *m/z* 335 (M⁺).

Preparation of 4-(anthracen-9-ylmethyl-methyl-amino)-butyric acid (2)

A solution of **1** (0.72 g, 2.15 mmol) in ethanol (30 ml) was added dropwise aqueous NaOH (0.5 g, 12.5 mmol, 50 mL) with stirring at 60 °C. After further stirring for 3 h under reflux, the solution was acidified to pH 4 with 2N HCl, and concentrated under reduced pressure. The residue was dissolved in dichloromethane, and washed with water. The residue was subjected to reprecipitation from dichloromethane–hexane to give **2** (0.64 g, yield 97 %) as a deliquescent yellow powder; IR (ATR): $\tilde{v} = 1706 \text{ cm}^{-1}$; ¹H NMR (acetone-d₆, TMS) $\delta = 1.82-1.86$ (2H, m), 2.22 (3H, s), 2.26 (2H, t), 2.68 (2H, t), 4.51 (2H, s), 7.48–7.57 (4H, m), 8.07 (2H, d, J = 8.80 Hz), 8.56 (3H, t); EIMS m/z 307 (M⁺).