



A Red-Emitting AIE-Fluorescent Probe for CN⁻ Detection

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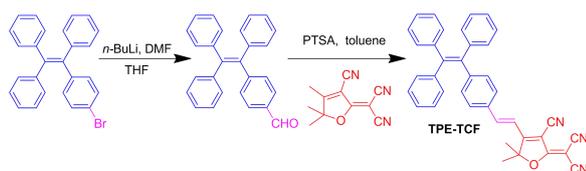
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INTRODUCTION

Cyanide is widely used in many fields such as electroplating, gold mining, metallurgy, resins industry and synthetic fibers.¹ However, owing to its extremely toxic in biological systems, cyanide does an extremely harm to the body. Up to now, numbers of approaches have been explored for the cyanide detecting and the fluorescent method is a facile and sensitive one.² Herein, we present a work of using an AIE-active fluorescence probe to detect CN⁻ over other anions.³

RESULTS AND SUMMARY

Molecular Synthesis



Scheme 1. Synthesis route of TPE-TCF

Aggregation-Induced Emission (AIE)

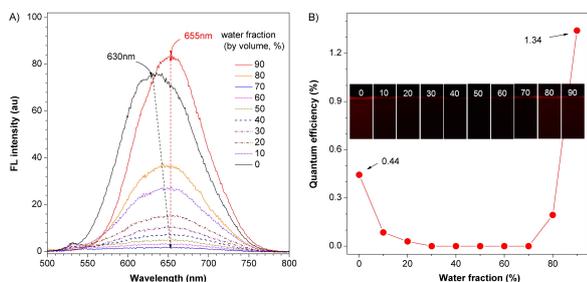


Fig. 1. (A) Fluorescence (FL) spectra of TPE-TCF in THF/water mixtures; (B) Variation of the FL quantum efficiency with water fractions (f_w).

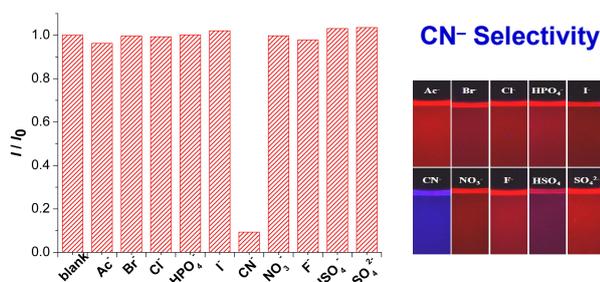


Fig. 2. Fluorescent responses of TPE-TCF to different anions.

Time and CN⁻ Concentration Dependence

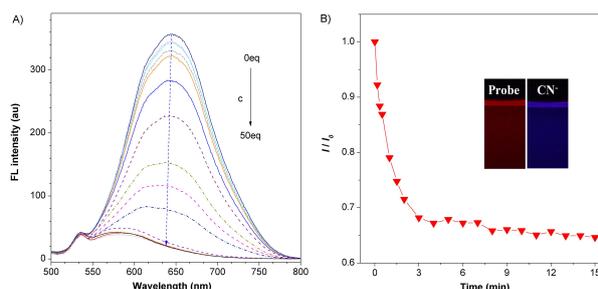


Fig. 3. A) Changes of FL intensity of TPE-TCF with different CN⁻ concentrations, B) Time-dependent FL intensity of TPE-TCF with CN⁻ (1 μM) in THF/water = 9/1.

SUMMARY

A 2-dicyanomethylene-3-cyano-4,5,5-trimethyl-2,5-dihydrofuran modified tetraphenylethene (TPE-TCF) was synthesized. TPE-TCF is a red emitting molecule and shows typical AIE behaviour. Due to the strong electron withdrawing ability, the C=C bond bridging TPE and TCF moieties is activated and becomes sensitive to nucleophilic agents. Introducing CN⁻ into the TPE-TCF solution triggered the nucleophilic addition reaction, which leads to the decrease of red-emission intensity (640 nm). The time course and CN⁻ concentration-dependent fluorescence responses have been also investigated. Other common anions shows negligible changes. These data indicate TPE-TCF is a promising fluorescent probe for CN⁻ detection.

ACKNOWLEDGMENTS

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