polymers

MDPI

Supplementary Materials

Highly Sensitive Detection of Benzoyl Peroxide Based on Organoboron Fluorescent Conjugated Polymers

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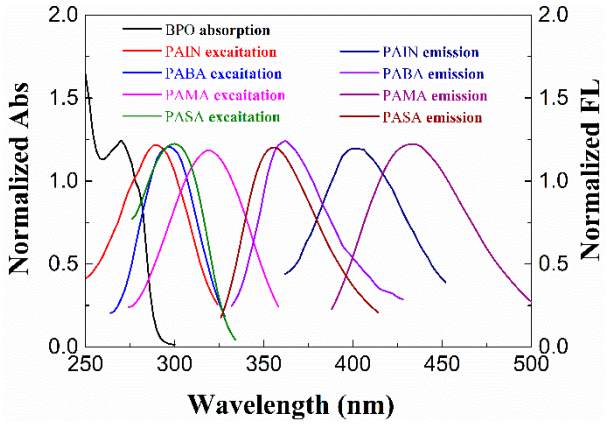

Figure 1. Normalized UV-vis absorption spectra of BPO and the fluorescence excitation and emission spectra of FCPs.

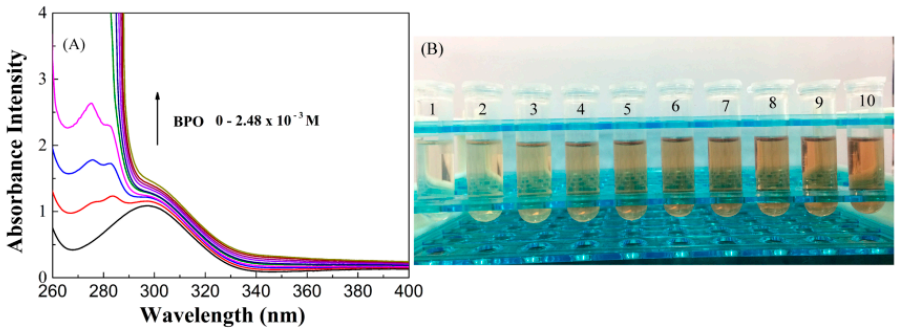

Figure 2. (A) UV-vis absorption spectra of PABA treated with BPO (0–2.48×10^{-3} M) and (B) photographs of PABA treated with BPO.

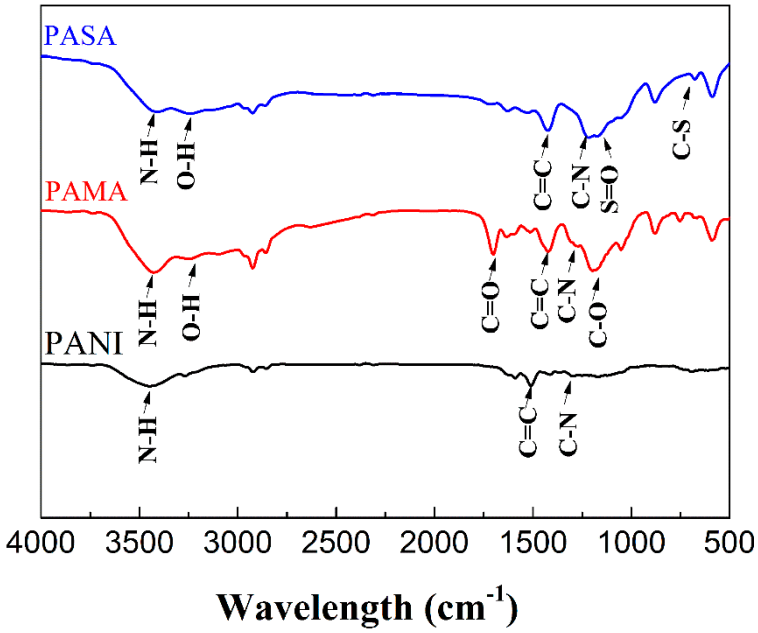

Figure 3. FT-IR spectra of PANI, PAMA, and PASA.

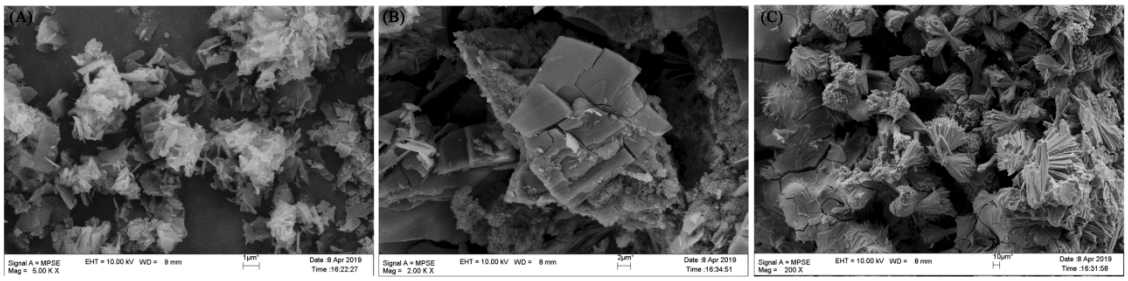

Figure 4. SEM images of (A) PANI, (B) PAMA, and (C) PASA.

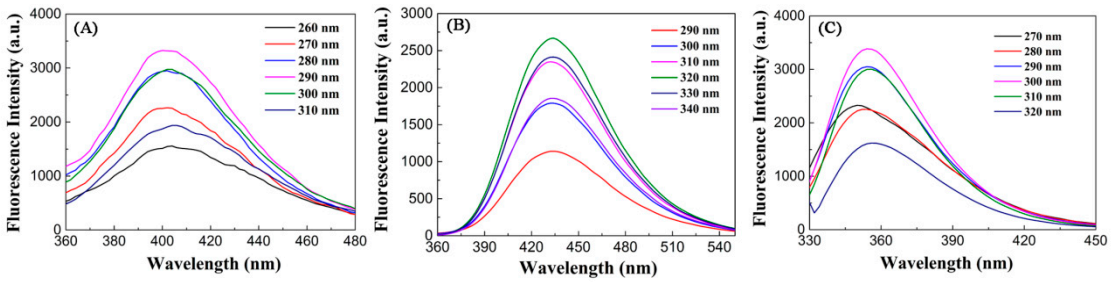

Figure 5. Fluorescence emission spectra of (A) PANI, (B) PAMA, and (C) PASA at different excitation wavelengths in ethanol.

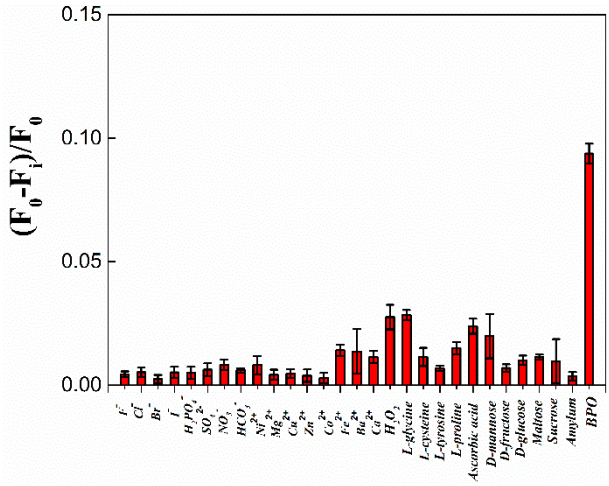

Figure 6. Comparison of the relative fluorescence intensity ($(F_0–F_i)/ F_0$) of PABA (0.25 mg mL^{-1}) reacting with different substance (8.26×10^{-6} M). F_0 and F_i are the fluorescent intensity of PABA in the absence and presence of different substance, respectively.

Table 1. Elemental analyses results of the obtained FCPs.

FPCs	C %	N %	O %	S %	B %
PANI	53.13	46.87	-	-	-
PABA	55.11	8.25	22.09	-	14.55
PAMA	51.19	11.34	37.47	-	-
PASA	68.94	12.98	11.13	6.94	-

Table 2. Zeta potentials of the obtained FCPs in water (T = 25 °C, 0.25 mg mL^{-1}).

Sample	Zeta potential (mV)
PANI	1.43± 0.10
PABA	−28.4 ± 0.70
PAMA	−24.2 ± 0.91
PASA	−26.0 ± 1.00

Table 3. Comparison of molecular weight of PABA treated without/with BPO.

Sample	Treat PABA	Number Average Molecular Weight (M_n)	Weight Average Molecular Weight (M_w)	Molecular Weight Distribution (Pd)
1	Without BPO	3172	3337	1.05
2	With BPO	3338	3563	1.07

Table 4. Comparison of different methods for the determination of BPO.

Method	Linearity range (M)	Detection limit (M)	Ref.

Chromogenic substrate-based spectrophotometric	8.26×10^{-4} – 4.13×10^{-3}	1.03×10^{-4}	1
Natural reagent extracts-based spectrophotometric	3.88×10^{-5} – 4.13×10^{-4}	1.61×10^{-5}	2
Peroxidases- based amperometric	5.00×10^{-6} – 5.50×10^{-5}	2.50×10^{-6}	3
Chromatography detection	8.26×10^{-6} – 8.26×10^{-4}	1.20×10^{-6}	4
Au@Ag nanorods-based colorimetric	0–1.00×10^{-4}	7.50×10^{-7}	5
Rhodamine spectroscopic probe	8.26×10^{-7} – 1.32×10^{-5}	2.48×10^{-7}	6
Ratiometric fluorescent probe	0–1.00×10^{-5}	1.63×10^{-7}	7
Near-Infrared fluorescent probe	5.00×10^{-7}– 4.00×10^{-6}	4.70×10^{-8}	8
This method	8.26×10^{-9} – 8.26×10^{-4}	1.06×10^{-9}	

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