

## Electronic Supplementary Information

**Silica aerogel modified electrospun polyacrylonitrile as a sorbent for thin-film  
microextraction of chlorpyrifos from real samples coupled with corona discharge ion  
mobility spectrometry detection**

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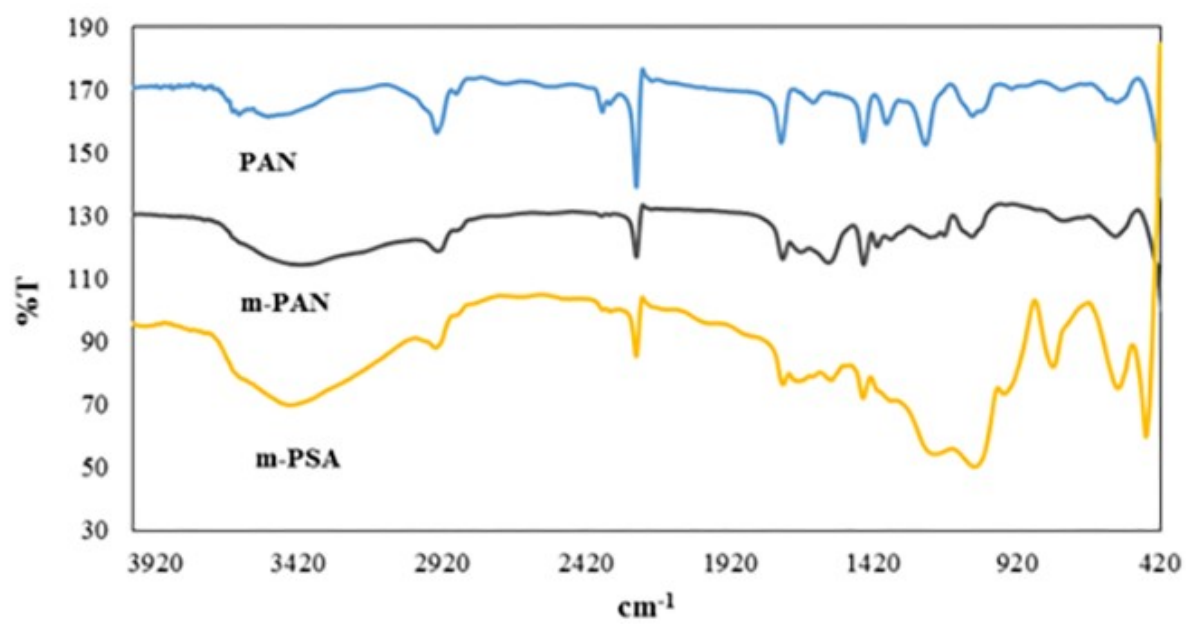


Fig. S1 The FT-IR spectra of PAN, m-PAN, and m-PSA.

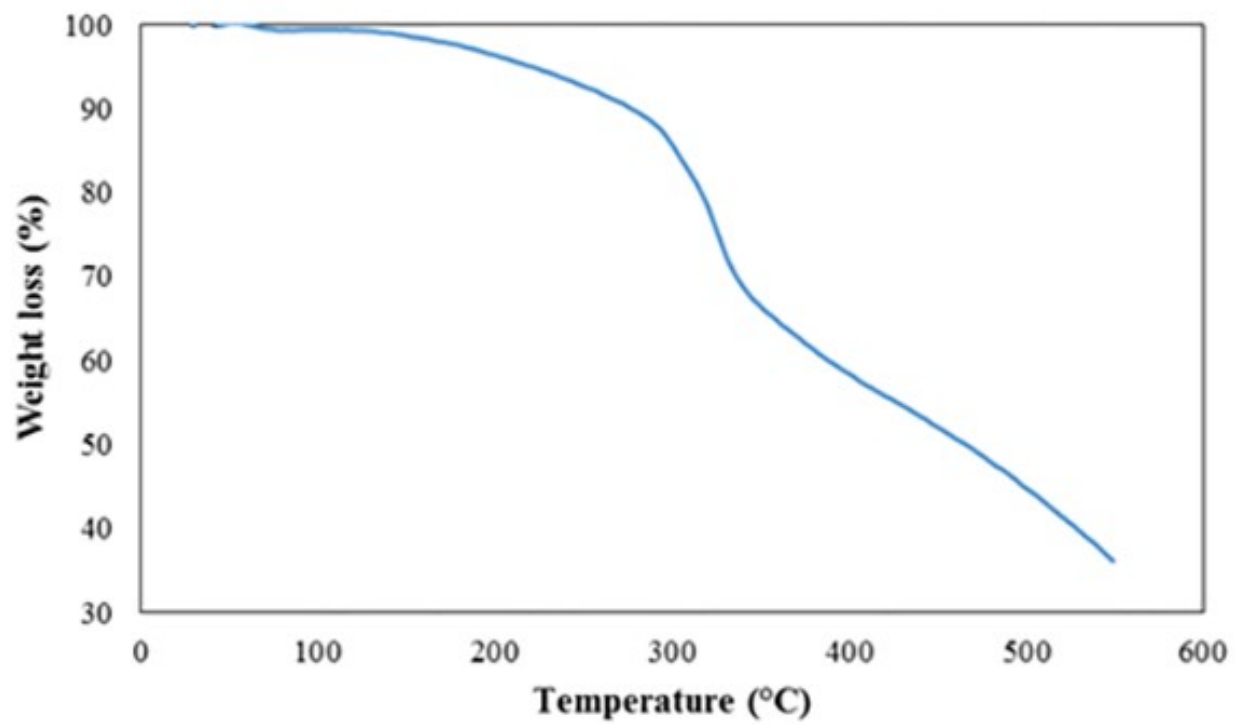


Fig. S2 The TGA curve of m-PSA.

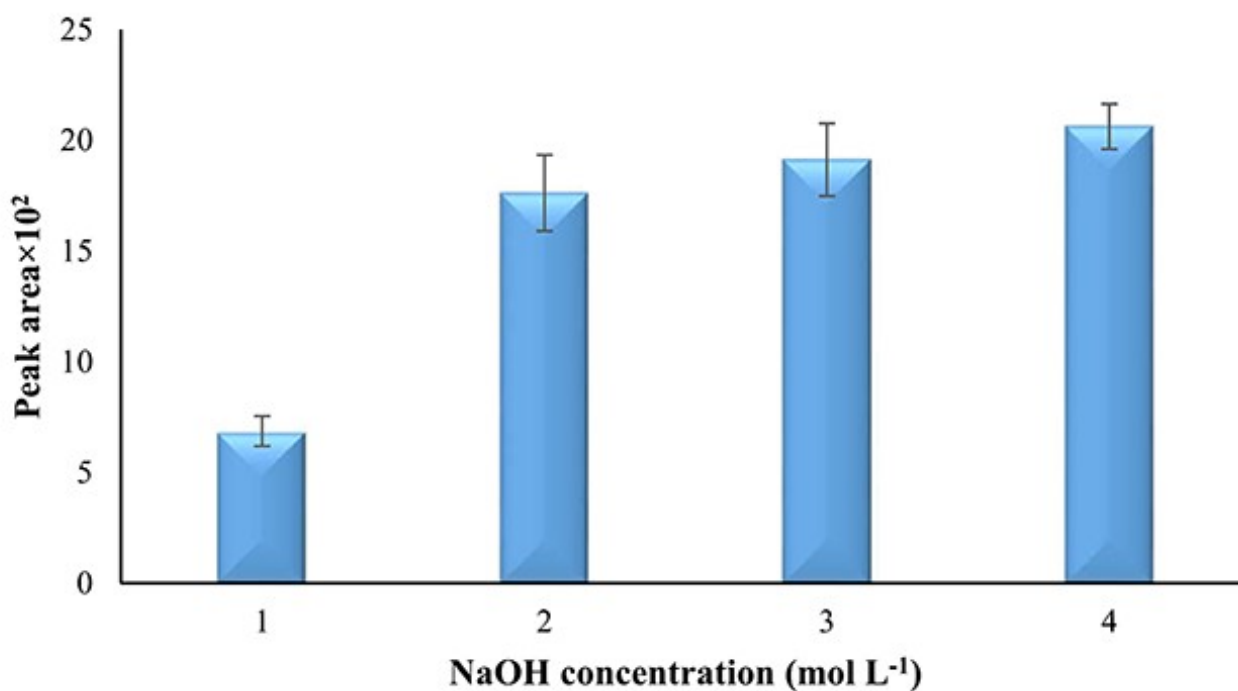


Fig. S3 The effect of NaOH concentration on the extraction efficiency (analyte concentration; 20  $\mu\text{g L}^{-1}$ , hydrolysis temperature; 60  $^{\circ}\text{C}$ , hydrolysis time; 2 h, ammonia concentration; 1.5% (v/v), immersion time in ammonia solution; 10 min, gelation time; 30 s, stirring rate; 800 rpm, extraction temperature; 25  $^{\circ}\text{C}$ , and extraction time; 10 min).

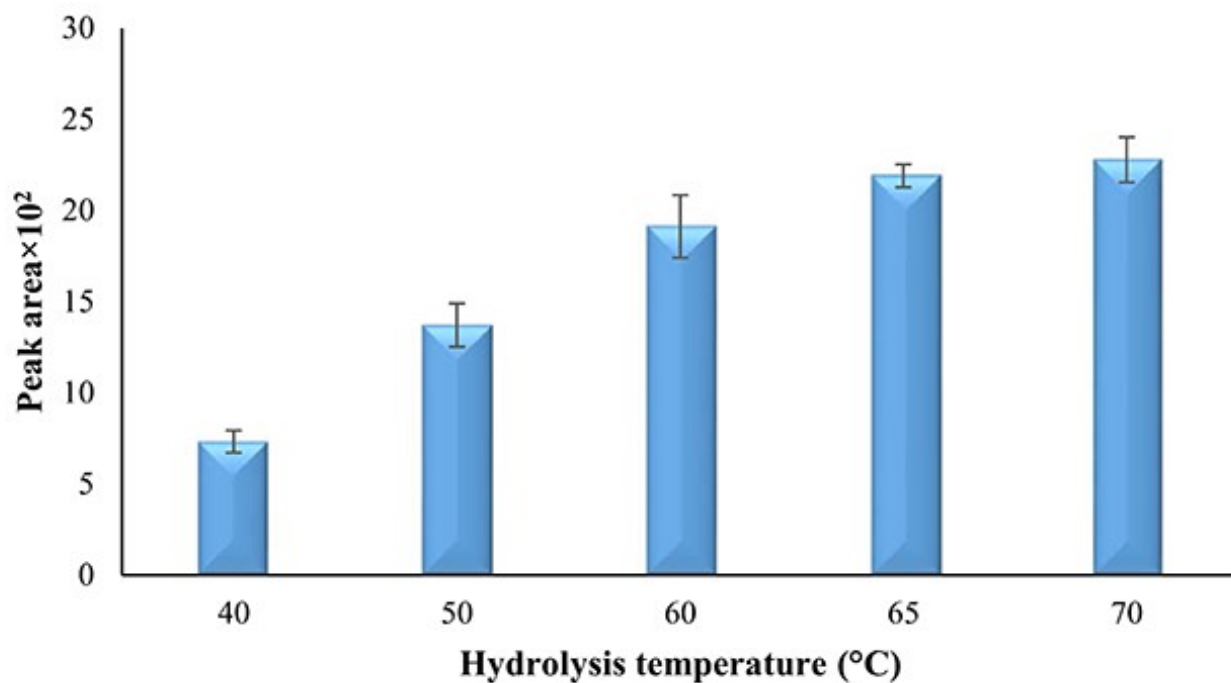


Fig. S4 The effect of hydrolysis temperature on the extraction efficiency (analyte concentration;  $20 \mu\text{g L}^{-1}$ , NaOH concentration;  $3 \text{ mol L}^{-1}$ , hydrolysis time; 2h, ammonia concentration; 1.5% (v/v), immersion time in ammonia solution; 10 min, gelation time; 30 s, stirring rate; 800 rpm, extraction temperature;  $25 \text{ }^\circ\text{C}$ , and extraction time; 10 min).

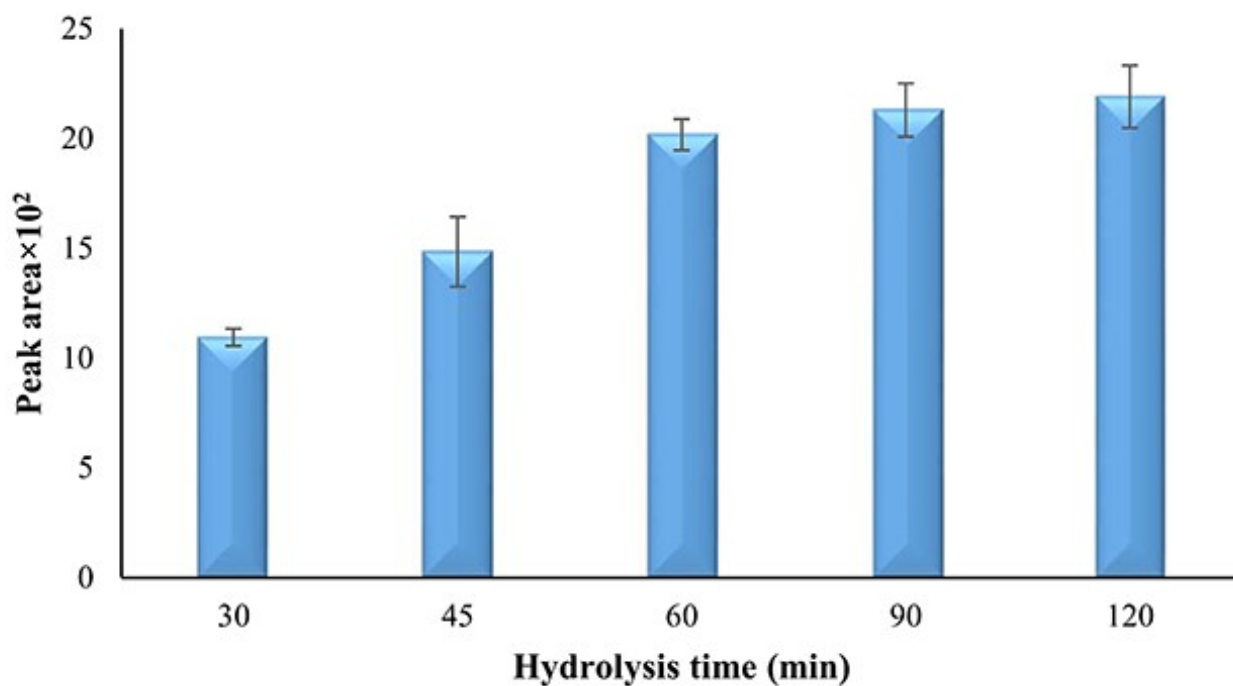


Fig. S5 The effect of hydrolysis time on the extraction efficiency (analyte concentration;  $20 \mu\text{g L}^{-1}$ , NaOH concentration;  $3 \text{ mol L}^{-1}$ , hydrolysis temperature;  $65 \text{ }^\circ\text{C}$ , ammonia concentration;  $1.5\% \text{ (v/v)}$ , immersion time in ammonia solution; 10 min, gelation time; 30 s, stirring rate; 800 rpm, extraction temperature;  $25 \text{ }^\circ\text{C}$ , and extraction time; 10 min).

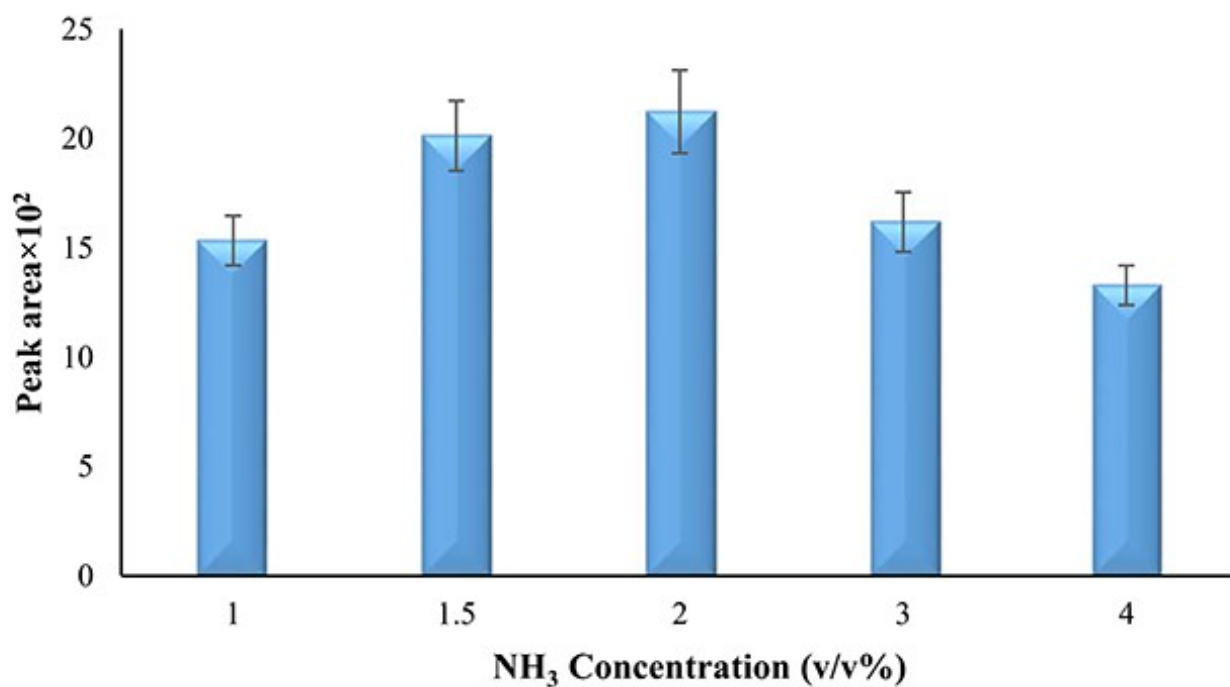


Fig. S6 The effect of ammonia concentration on the extraction efficiency (analyte concentration; 20  $\mu\text{g L}^{-1}$ , NaOH concentration; 3 mol  $\text{L}^{-1}$ , hydrolysis temperature; 65  $^{\circ}\text{C}$ , hydrolysis time; 1 h, immersion time in ammonia solution; 10 min, gelation time; 30 s, stirring rate; 800 rpm, extraction temperature; 25  $^{\circ}\text{C}$ , and extraction time; 10 min).

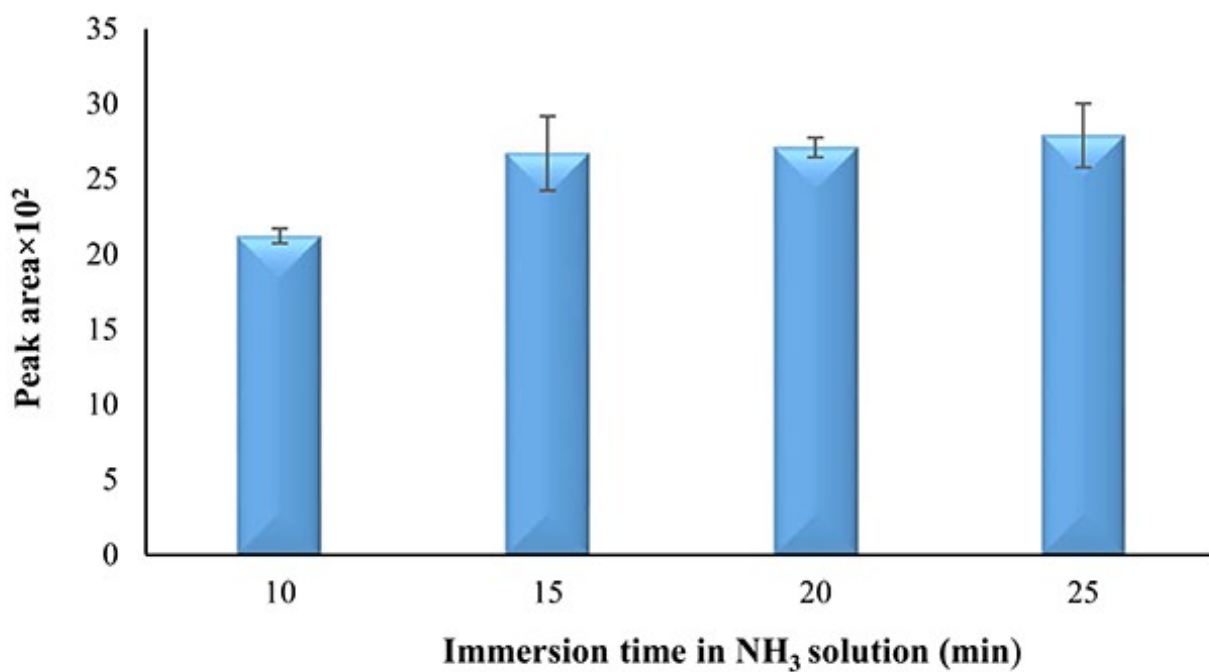


Fig. S7 The effect of immersion time in ammonia solution on the extraction efficiency (analyte concentration; 20  $\mu\text{g L}^{-1}$ , NaOH concentration; 3 mol  $\text{L}^{-1}$ , hydrolysis temperature; 65  $^{\circ}\text{C}$ , hydrolysis time; 1h, ammonia concentration; 2% (v/v), gelation time; 30 s, stirring rate; 800 rpm, extraction temperature; 25  $^{\circ}\text{C}$ , and extraction time; 10 min).



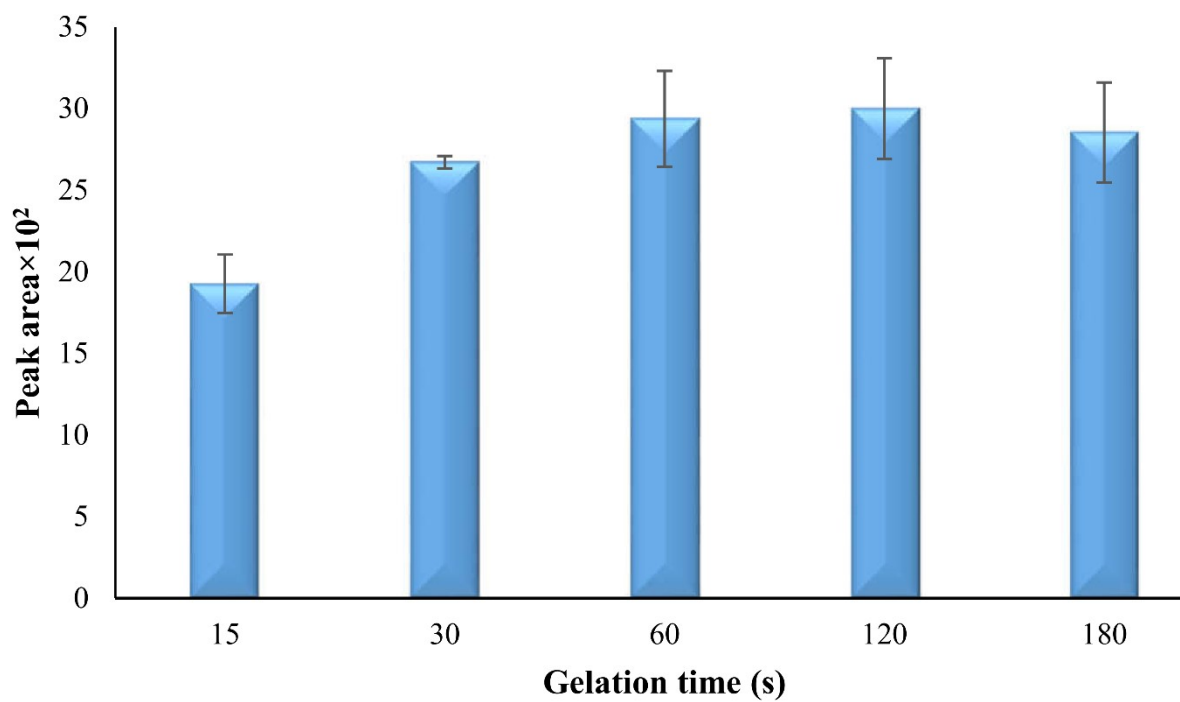


Fig. S8 The effect of gelation time on the extraction efficiency (analyte concentration;  $20 \mu\text{g L}^{-1}$ , NaOH concentration;  $3 \text{ mol L}^{-1}$ , hydrolysis temperature;  $65 \text{ }^\circ\text{C}$ , hydrolysis time; 1 h, ammonia concentration; 2% (v/v), immersion time in ammonia solution; 15 min, stirring rate; 800 rpm, extraction temperature;  $25 \text{ }^\circ\text{C}$ , and extraction time; 10 min).

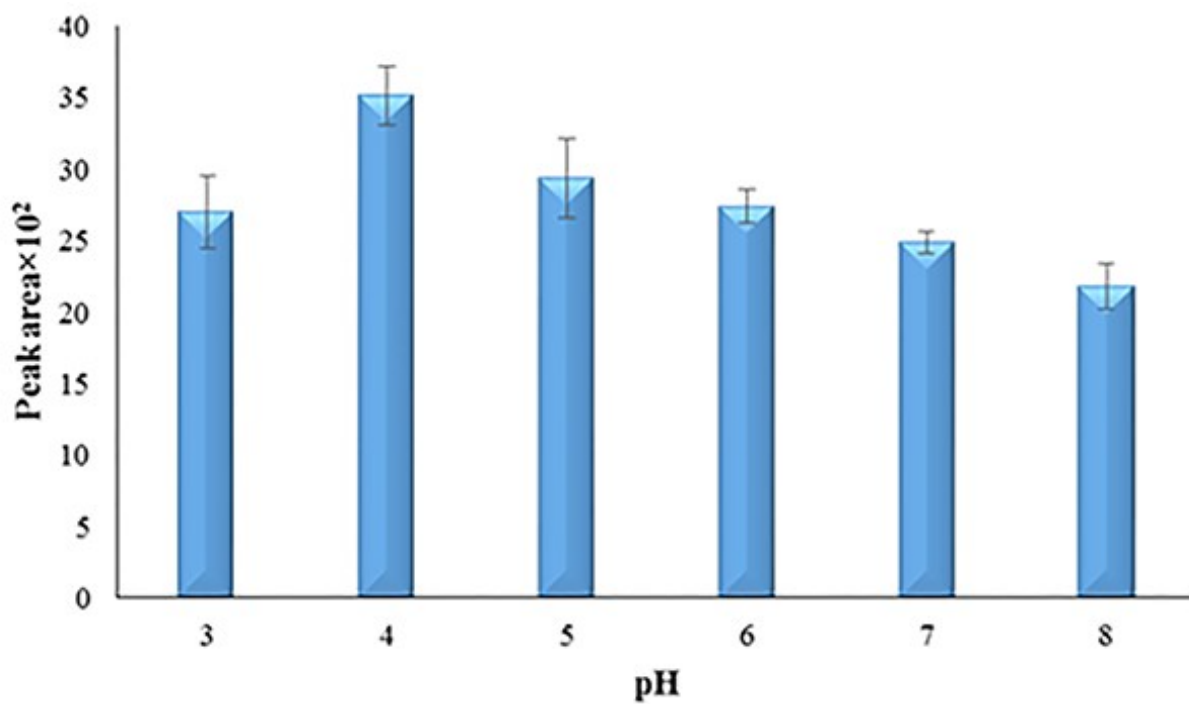


Fig. S9 The effect of solution pH on the extraction efficiency (analyte concentration; 20  $\mu\text{g L}^{-1}$ , NaOH concentration; 3  $\text{mol L}^{-1}$ , hydrolysis temperature; 65  $^{\circ}\text{C}$ , hydrolysis time; 1 h, ammonia concentration; 2% (v/v), immersion time in ammonia solution; 15 min, gelation time; 1 min, stirring rate; 800 rpm, extraction temperature; 25  $^{\circ}\text{C}$ , and extraction time; 10 min).

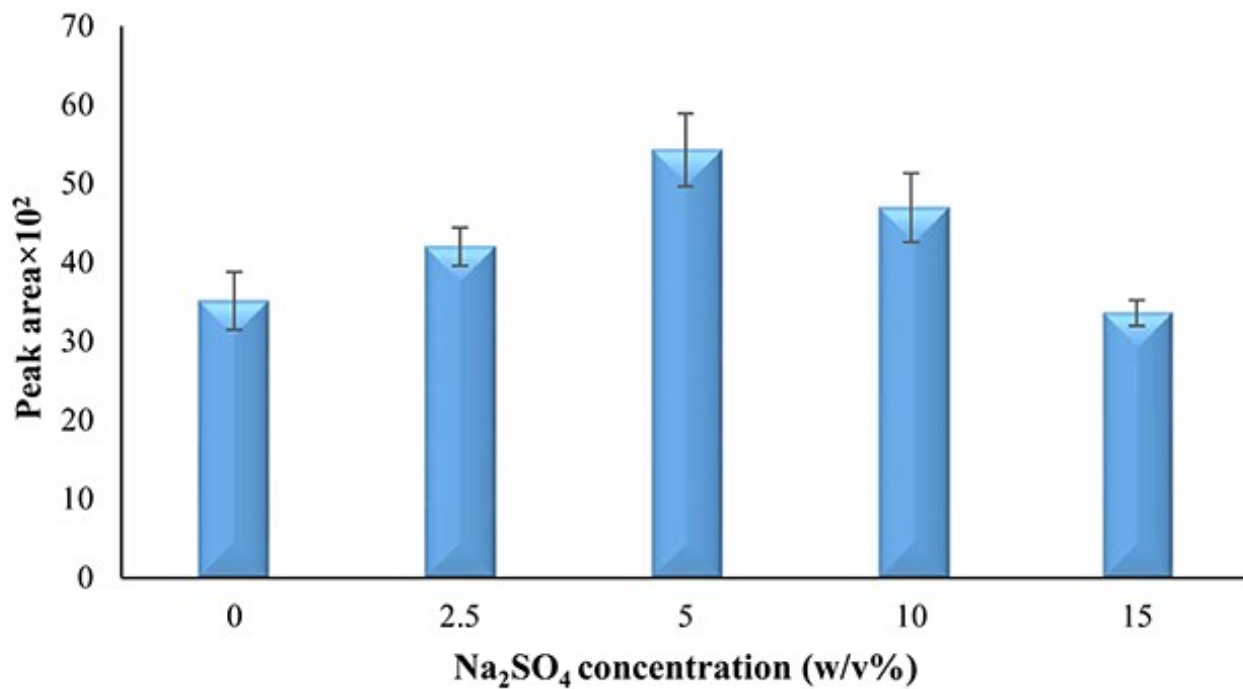


Fig. S10 The effect of ionic strength on extraction efficiency (analyte concentration;  $20 \mu\text{g L}^{-1}$ , NaOH concentration;  $3 \text{ mol L}^{-1}$ , hydrolysis temperature;  $65 \text{ }^\circ\text{C}$ , hydrolysis time; 1 h, ammonia concentration; 2% (v/v), immersion time in ammonia solution; 15 min, gelation time; 1 min, solution pH; 4, stirring rate; 800 rpm, extraction temperature;  $25 \text{ }^\circ\text{C}$ , and extraction time; 10 min).

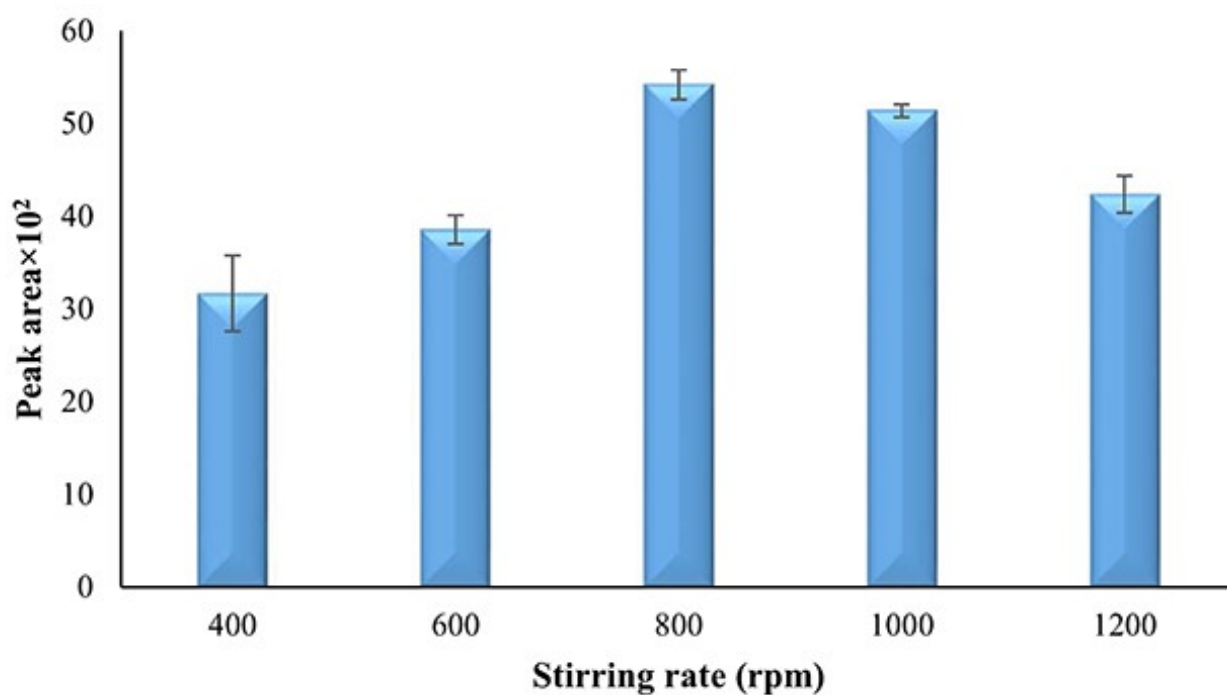


Fig. S11 The effect of stirring time on the extraction efficiency (analyte concentration;  $20 \mu\text{g L}^{-1}$ , NaOH concentration;  $3 \text{ mol L}^{-1}$ , hydrolysis temperature;  $65 \text{ }^\circ\text{C}$ , hydrolysis time; 1 h, ammonia concentration; 2% (v/v), immersion time in ammonia solution; 15 min, gelation time; 1 min, solution pH; 4,  $\text{Na}_2\text{SO}_4$  concentration; 5% (w/v), extraction temperature;  $25 \text{ }^\circ\text{C}$ , and extraction time; 10 min).

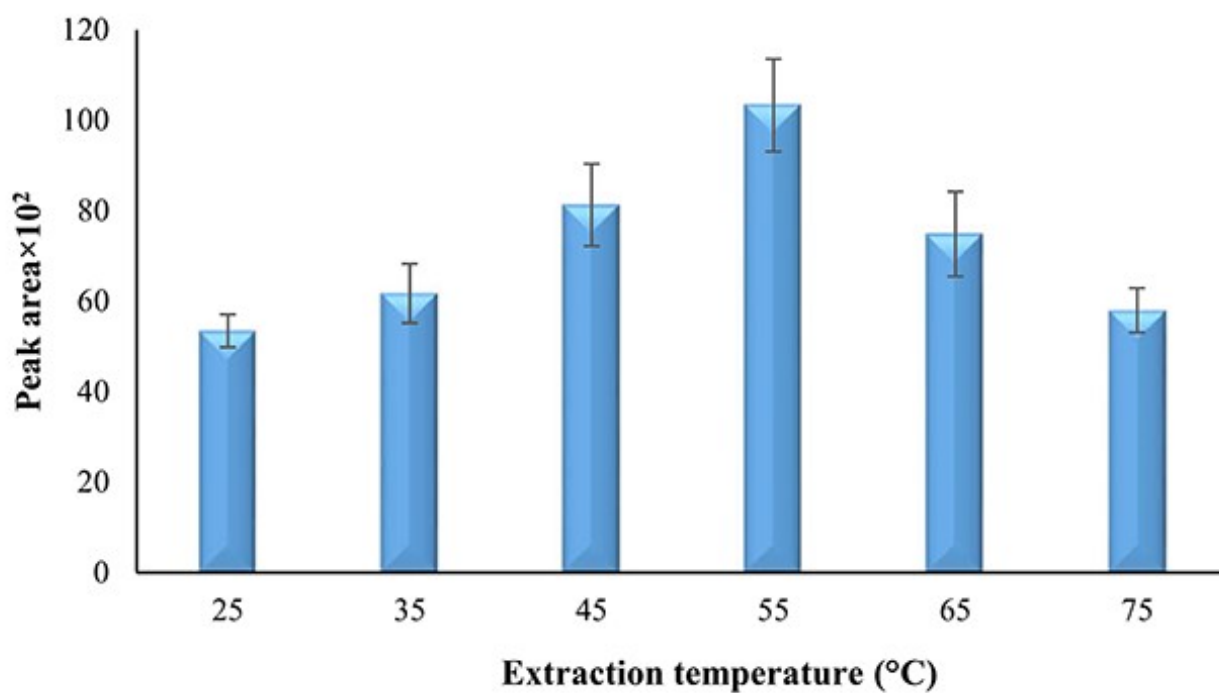


Fig. S12 The effect of extraction temperature on the extraction efficiency (analyte concentration;  $20 \mu\text{g L}^{-1}$ , NaOH concentration;  $3 \text{ mol L}^{-1}$ , hydrolysis temperature;  $65 \text{ }^\circ\text{C}$ , hydrolysis time; 1 h, ammonia concentration; 2% (v/v), immersion time in ammonia solution; 15 min, gelation time; 1 min, solution pH; 4,  $\text{Na}_2\text{SO}_4$  concentration; 5% (w/v), and extraction time; 10 min).

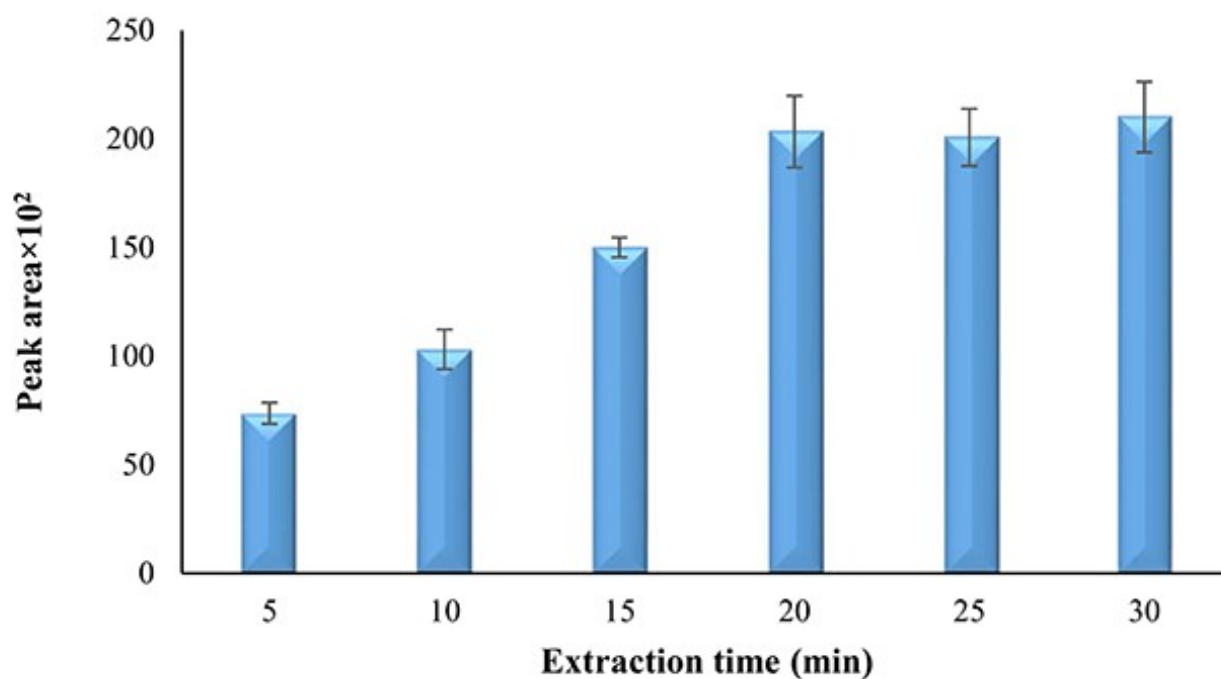


Fig. S13 The effect of extraction time on the extraction efficiency (analyte concentration;  $20 \mu\text{g L}^{-1}$ , NaOH concentration;  $3 \text{ mol L}^{-1}$ , hydrolysis temperature;  $65 \text{ }^\circ\text{C}$ , hydrolysis time; 1 h, ammonia concentration; 2% (v/v), immersion time in ammonia solution; 15 min, gelation time; 1 min, solution pH; 4,  $\text{Na}_2\text{SO}_4$  concentration; 5% (w/v), and extraction temperature;  $55 \text{ }^\circ\text{C}$  ).

**Table S1** Operation parameters of CD-IMS

Parameter	Setting
Needle voltage	4.0 kV
Target electrode voltage	8.0 kV
Drift field	450 V cm <sup>-1</sup>
Drift gas flow (N <sub>2</sub> )	1000 mL min <sup>-1</sup>
Carrier gas flow (N <sub>2</sub> )	800 mL min <sup>-1</sup>
Temperature of cell	160 °C
Temperature of injector	200 °C
Drift tube length	11 cm
Shutter gride pulse	200 μs
Sampling frequency	25000 Hz