

Electronic Supplementary Information

Detection of diethyl chlorophosphate by composite optical waveguide sensor

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Synthesis of Rhodamine B hydrazide (RbH):

In a three-neck flask (100 mL), 1.2 g of rhodamine B was dissolved in 30 mL ethanol (30 mL), and then 5 mL hydrazine hydrate was added. The reaction mixture was refluxed for 2 h and then cooled to room temperature. The remaining ethanol was quickly evaporated by a vacuum rotary evaporator and then 60 mL hydrochloric acid (1 mol/L) was added in to the mixture. After that, 70 mL sodium hydroxide solution (1 mol/L) was added to the mixture, and the precipitation could be observed soon after the sodium hydroxide solution was added. After filtration under reduced pressure, the solid was washed with water and dried to afford the pure product as a pale pink powder solid (yield 40%).

¹H NMR (600 MHz, Chloroform-*d*) δ 7.96 – 7.91 (m, 1H), 7.47 – 7.42 (m, 2H), 7.13 – 7.08 (m, 1H), 6.46 (d, J = 8.8 Hz, 2H), 6.42 (d, J = 2.6 Hz, 2H), 6.29 (dd, J = 8.9, 2.6 Hz, 2H), 3.61 (s, 2H), 3.34 (q, J = 7.1 Hz, 8H), 1.17 (t, J = 7.0 Hz, 12H). ¹³C NMR (151 MHz, CDCl₃) δ 166.15, 153.85, 151.55, 148.88, 132.56, 132.51, 130.03, 128.19, 128.12, 128.10, 128.07, 127.70, 123.83, 123.00, 109.97, 108.14, 108.03, 104.54, 98.50, 97.96, 65.93, 49.45, 44.50, 44.38, 38.29, 17.68, 14.76, 12.63. ESI-MS m/z calcd. for C₂₈H₃₂N₄O₂: 456.2, found: [M+H]⁺ 457.2.

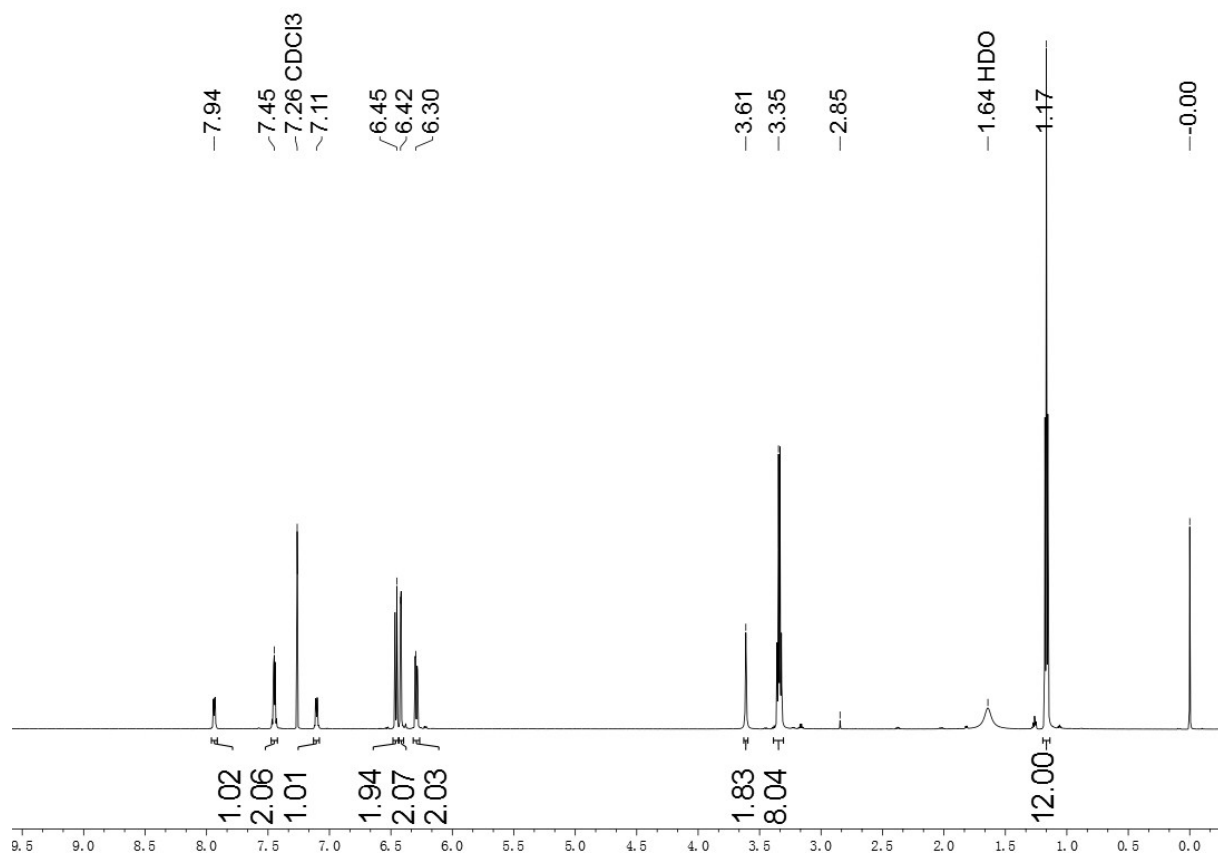


Fig. S1 ¹H NMR spectrum of RbH in CDCl₃.

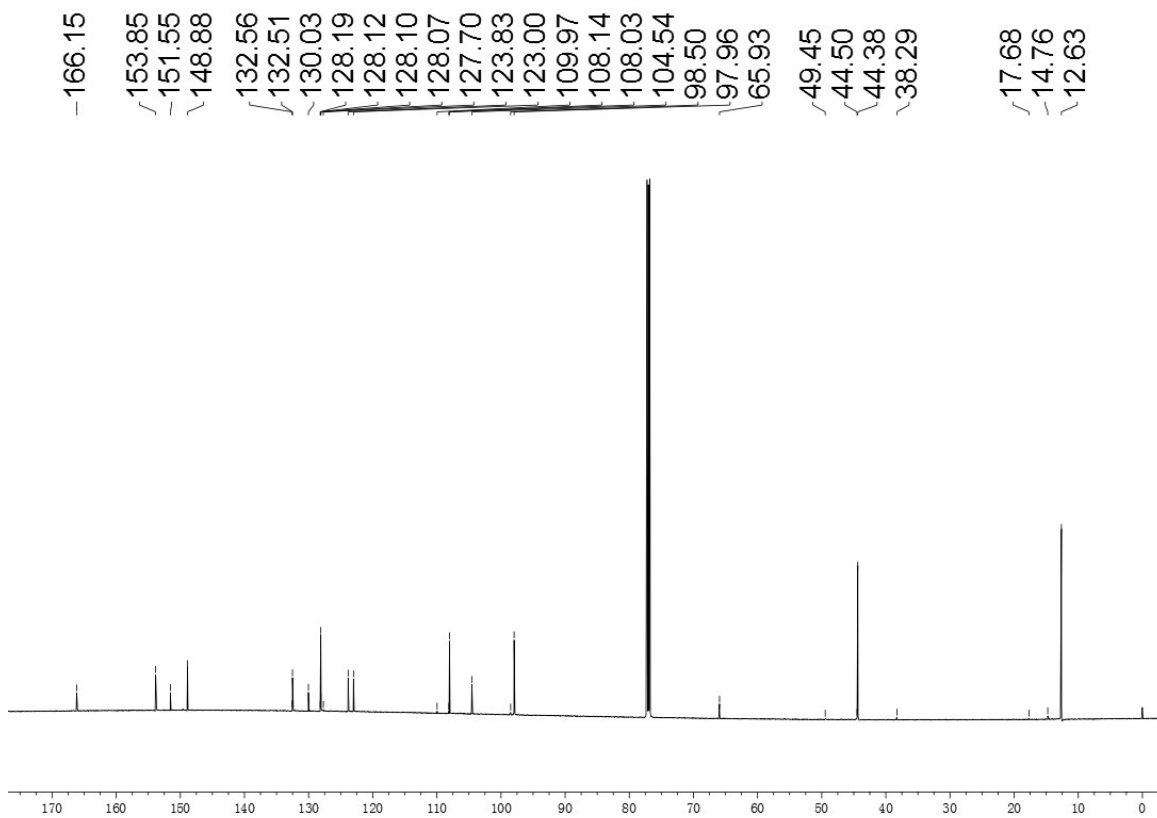


Fig. S2 ¹³C NMR spectrum of RbH in CDCl₃.

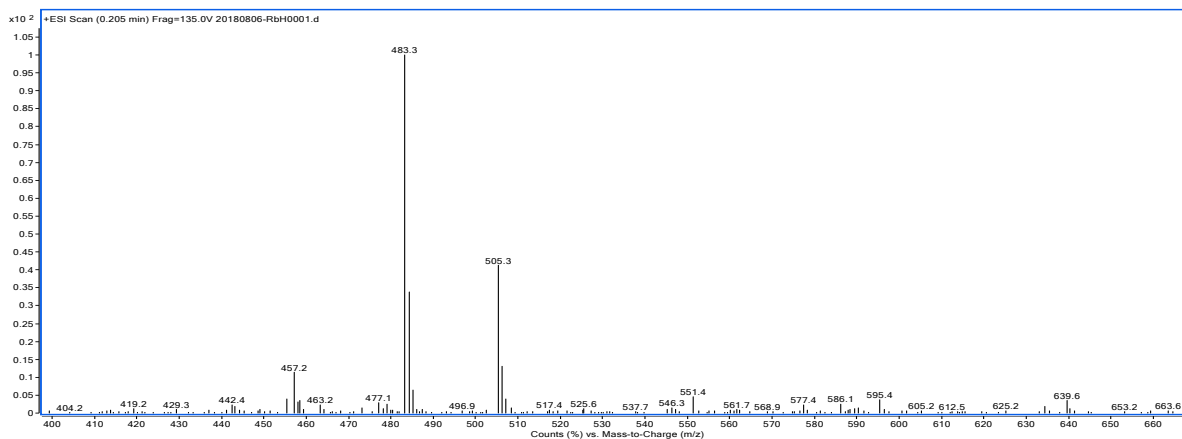


Fig. S3 Mass spectrum of RbH; m/z : 457.2 [M+H]⁺.

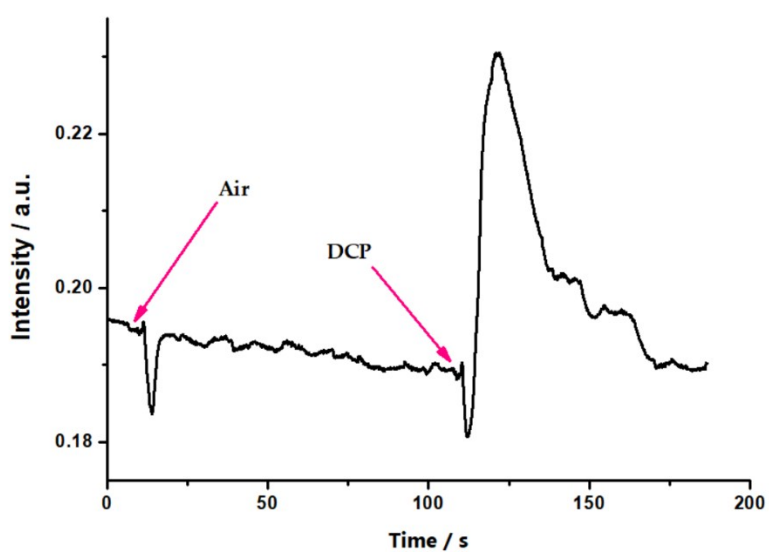


Fig. S4 Compare response of COWG sensor to air and 26.32×10^{-6} (volume fraction) of DCP vapor.

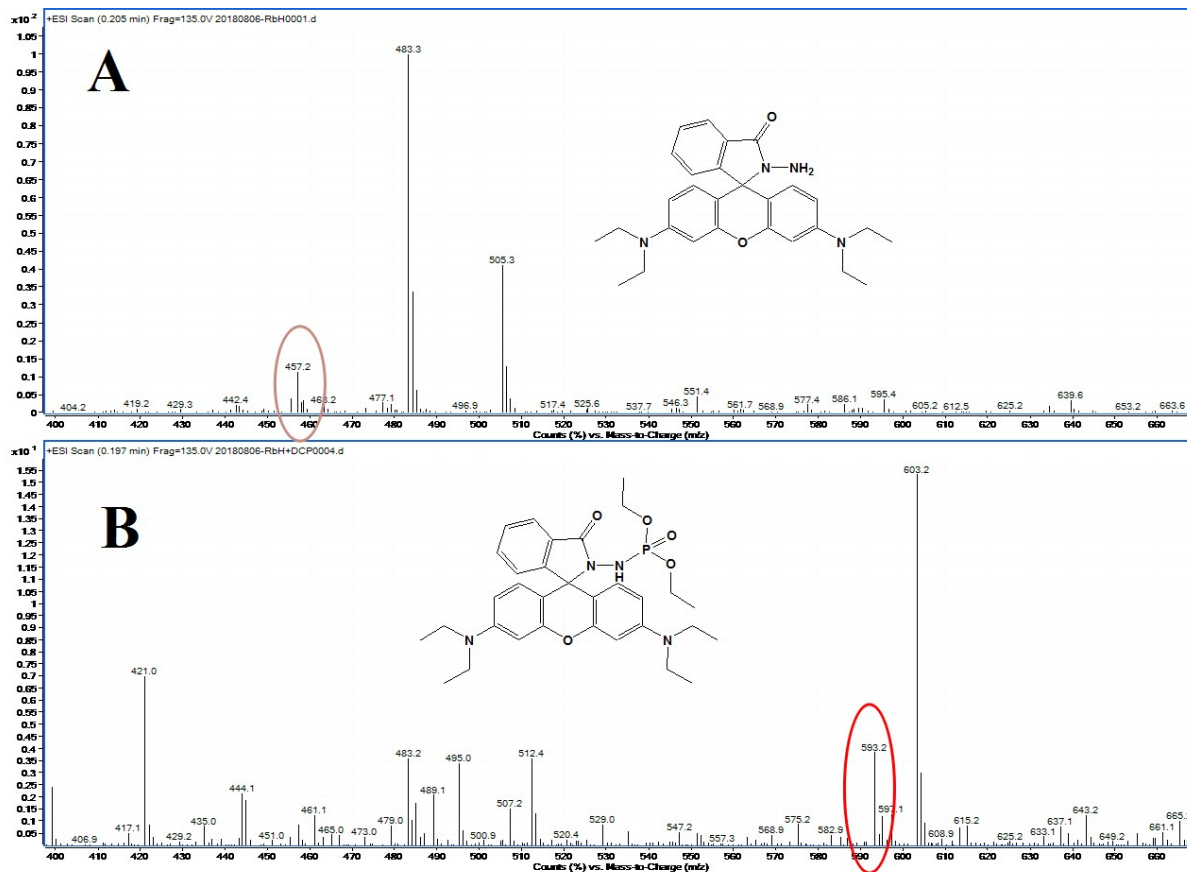


Fig. S5 Mass spectra of RbH and a mixture of RbH with DCP.
 (a) RbH; (b) RbH-DCP.

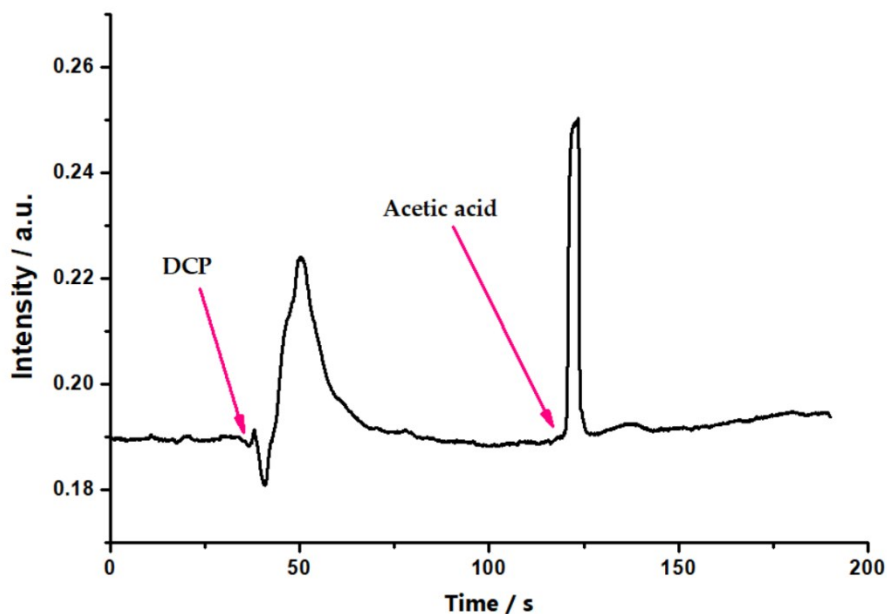


Fig. S6 Compare response of COWG sensor to 26.32×10^{-6} (volume fraction) of DCP vapor and saturated steam of acetic acid.