Supporting Information

Development of a Novel Label-Free NIR Aptasensor Based on Triphenylmethane Dyes for Rapid and Sensitive Detection of Copper Ion

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Materials and Instruments

All the commercial analytical reagents were used without further purification. Metal salt compounds: ferrous sulfate heptahydrate, ferric chloride hexahydrate, palladium chloride, chromium chloride, nickel chloride, cuprous iodide, zinc iodide, cobalt fluoride, calcium chloride, manganese sulfate, barium chloride, zirconium chloride, cadmium chloride, mercuric chloride, magnesium chloride, sodium chloride, sodium sulfate anhydrous, sodium nitrite, disodium hydrogen phosphate, sodium dihydrogen phosphate are purchased from konoscience Co., Ltd. (Beijing, China) and Energy Chemical Co., Ltd. (China). Copper chloride ($CuCl_2$) was purchased from Aladdin Biochemical Technology Co., Ltd. (Shanghai, China). Dimethyl sulfoxide (DMSO), 2-morpholinoethanesulfonic acid (MES) and glycerin were purchased from J&K Scientific Ltd. (Beijing, China). An MES buffer consisting of 10 mM MES, 100 mM NaCl and 2 mM $MgCl_2$ (pH = 6.0) was prepared as a support electrolyte. Ultrapure water (Milli-Q, 18.2 MΩ) was obtained using a water purifier (Sartorius, Germany). Samples of lake water were collected at Henan University of Technology. The DNA oligomers used in this study were obtained from Sangon Bioengineering Co., Ltd (Shanghai, China). Stock solutions of dyes (10 mM) were prepared in DMSO.

The UV-Vis absorption and fluorescence spectra of each sample were recorded using a multimode microplate reader (Spark 10M, TECAN).

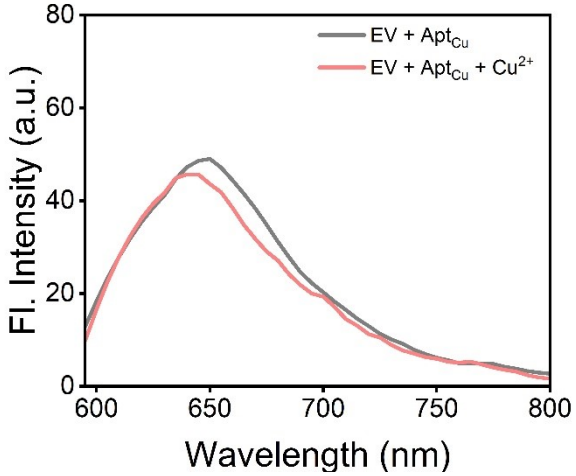

Figure S1. Fluorescence spectra of EV with or without Cu^{2+} in solution.

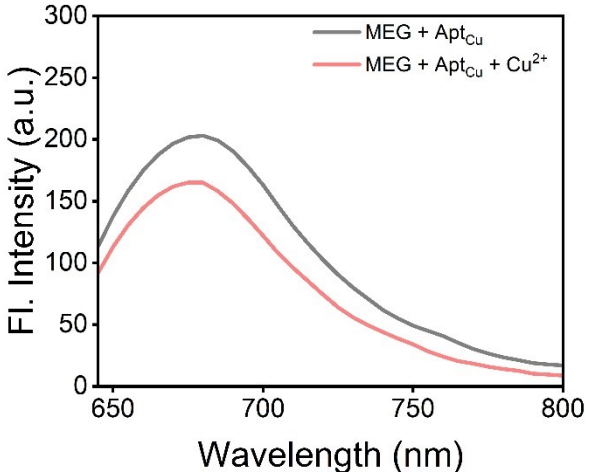

Figure S2. Fluorescence spectra of MEG with or without Cu^{2+} in solution.

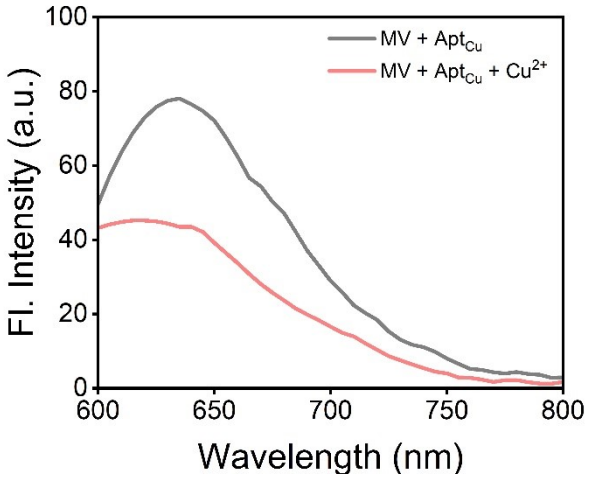

Figure S3. Fluorescence spectra of MV with or without Cu^{2+} in solution.

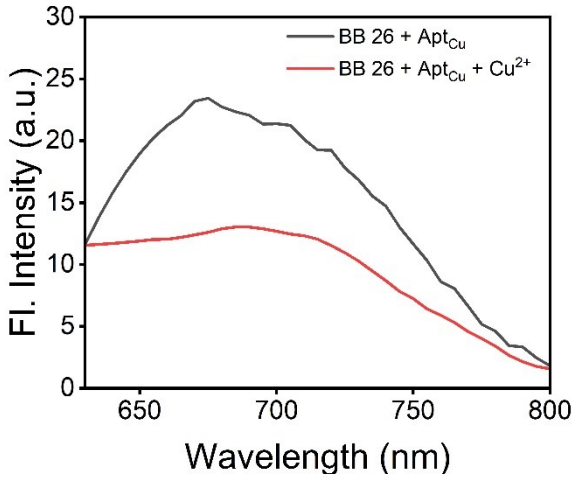

Figure S4. Fluorescence spectra of BB 26 with or without Cu^{2+} in solution.

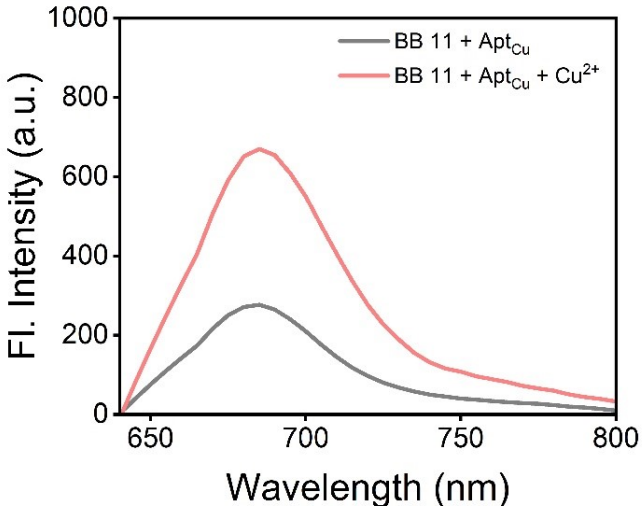

Figure S5. Fluorescence spectra of BB11 with or without Cu^{2+} in solution.

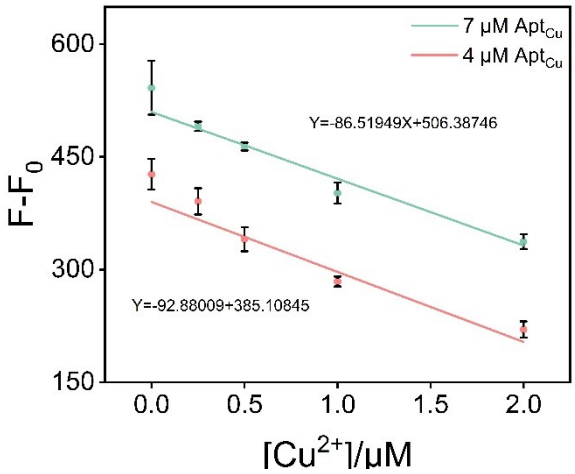

Figure S6. When the AptCu:CV ratio is set to 1.4:1 and 0.8:1, a linear relationship between fluorescence intensity and Cu^{2+} concentration is observed in the 0-2 μM range.

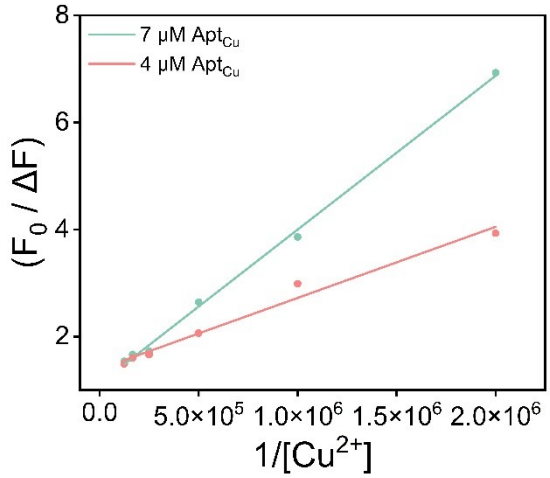

Figure S7. Benesai-Hildebrand plots for NIRApt with Cu^{2+}.