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New 8-Aminoquinoline Derivatives as "Turn-On" Fluorescent Sensor for Cd(II) ion Detection

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Two 8-aminoquinoline derivatives, Q1 and Q2, containing one and two quinoline groups, respectively, are synthesized. In water, Q1 and Q2 showed strong electronic absorption peaks at 340 nm and 350 nm, with molar extinction coefficients of 3605 and 2475 M-1cm-1, respectively. The solutions are weakly fluorescent having quantum efficiency below 10%. In the presence of metal ions, the strong fluorescence signal at 480 nm is observed exclusively with Cd(II) ion. The fluorescence enhancement was probably the result of the restriction of photo-induced electron transfer (PET) process. In aqueous Tris solution pH 7.4, Q2 shows significantly greater fluorescence enhancement ratio (I/I0) of 30-fold comparing with 7-fold observed for Q1. The fluorescence detection of Cd(II) ion in water is possible in a wide pH range of 4 to 9 with the detection limit as low as 25 nM.

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