

Supplementary Information

Directed-assembly of Fullerenols via Electrostatic and Coordination Dual-actuation Interactions to Fabricate Diverse and Water-soluble Metal Cation-fullerene Nanocluster Complexes

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This Supplementary Information includes:

Supplementary Figures 1 to 9

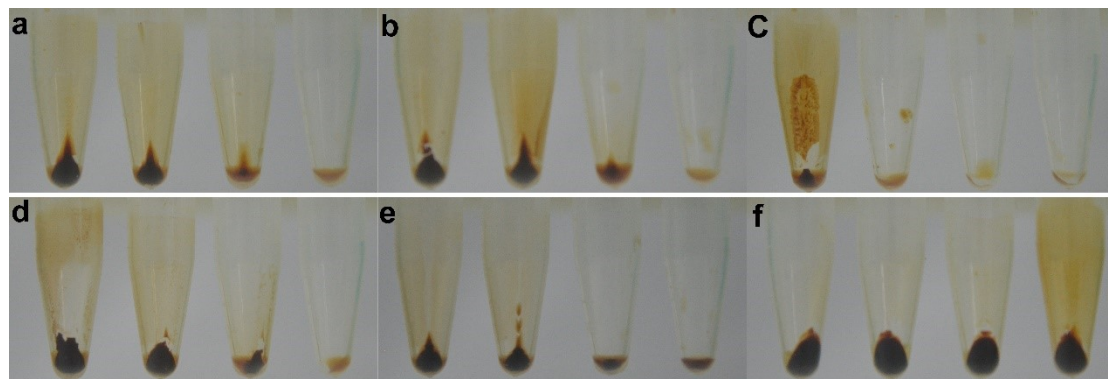


Figure S1 The photographs of precipitates in the plastic centrifuge tubes after centrifuging aqueous solution of **Fol** (4.0 mM, 0.5 ml) upon the addition of equivalent volume of (a) KCl, (b) NaCl, (c) LiCl, (d) CH₃COONa, (e) NaOH, or (f) HCl (from left to right $c_{\text{Fol}}:c_{\text{M}^+} = 1:1000, 1:500, 1:250, \text{ and } 1:100$). c is the molarity of alkali metal ion, hydrogen ion, or **Fol**.

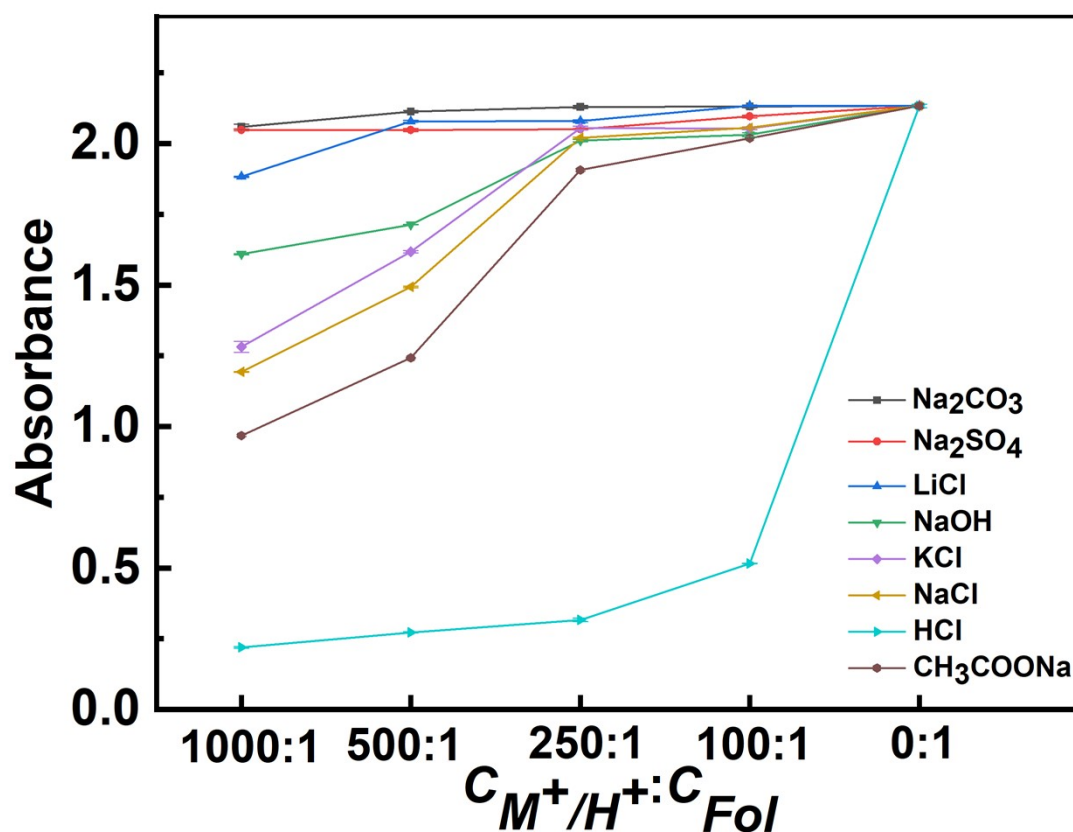


Figure S2 UV absorbances of 40-fold dilution of supernatants after centrifuging aqueous solution of **Fol** (4.0 mM, 0.5 ml) upon the addition of equivalent volume of KCl, NaCl, LiCl, HCl, Na_2SO_4 , Na_2CO_3 , CH_3COONa , or NaOH ($c_{Fol}:c_{M^+}/H^+= 1:1000, 1:500, 1:250, 1:100, \text{ and } 1:0$). c is the molarity of alkali metal ion, hydrogen ion, or **Fol**. The higher the absorption value was, the higher the concentration of **Fol** in supernatant was, correspondingly, the less precipitation was.

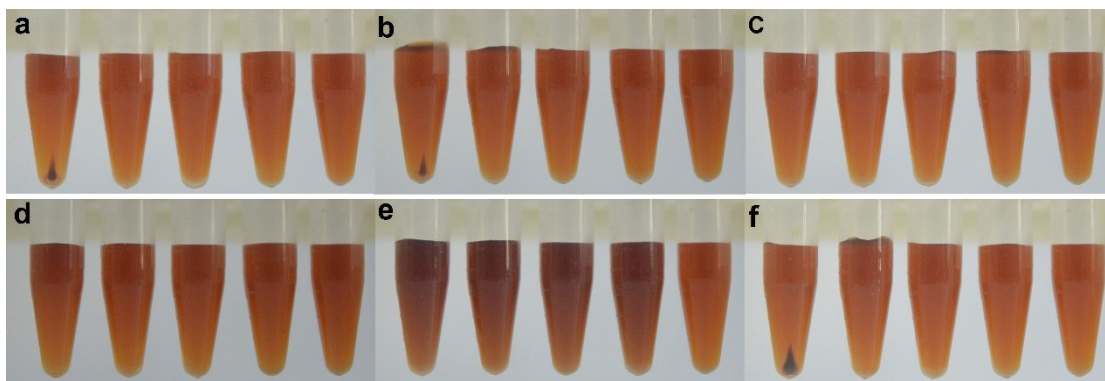


Figure S3 The photographs of aqueous solution of **Fol** (1.6 mM, 0.5 ml) upon the addition of equivalent volume of (a) KCl, (b) NaCl, (c) LiCl, (d) Na₂SO₄, (e) Na₂CO₃, or (f) CH₃COONa in the plastic centrifuge tubes (from left to right $c_{\text{Fol}}:c_{M^+} = 1:1000$, 1:500, 1:250, 1:100, and 1:0) after centrifugation. c is the molarity of alkali metal ion and **Fol**.



Figure S4 The photographs of precipitates in the plastic centrifuge tubes after centrifuging aqueous solution of **Fol** (1.6 mM, 0.5 ml) upon the addition of equivalent volume of (a) KCl, (b) NaCl, or (c) CH₃COONa (from left to right $c_{\text{Fol}}:c_{M^+} = 1:1000$, 1:500, 1:250, and 1:100). c is the molarity of alkali metal ion or **Fol**.

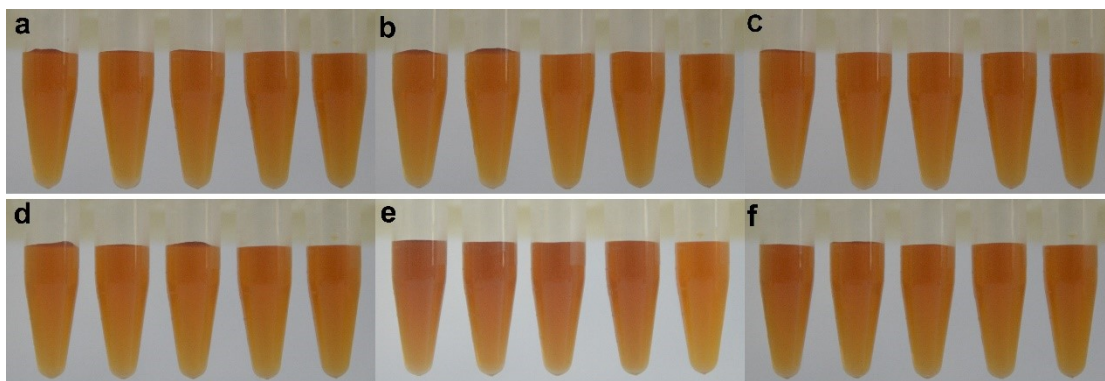


Figure S5 The photograph of aqueous solution of **Fol** (0.8 mM, 0.5 ml) upon the addition of equivalent volume of (a) KCl, (b) NaCl, (c) LiCl, (d) Na₂SO₄, (e) Na₂CO₃, or (f) CH₃COONa in the plastic centrifuge tubes (from left to right $c_{\text{Fol}}:c_{M^+} = 1:1000$, 1:500, 1:250, 1:100, and 1:0) after centrifuging. c is the molarity of alkali metal ion or **Fol**.

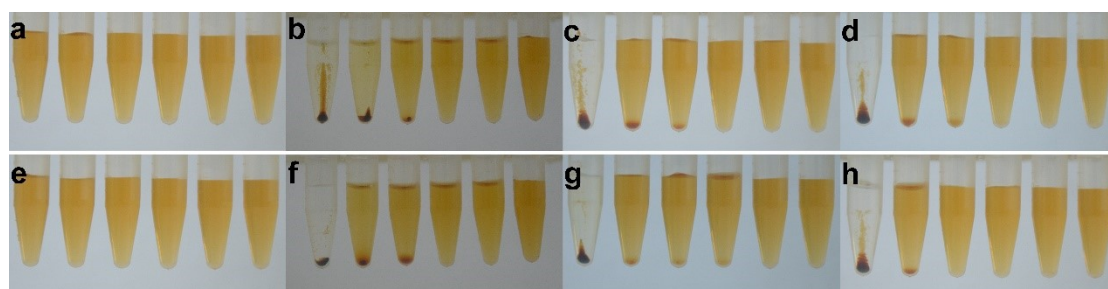


Figure S6 The photographs of aqueous solution of **Fol** (0.4 mM, 0.5 ml) upon the addition of equivalent volume of (a) NaCl (from left to right 1:1000, 1:100, 1:10, 1:5, 1:1, and 1:0), (b) MgCl₂ (1:100, 1:7.2, 1:7.1, 1:7.0, 1:1, and 1:0), (c) AlCl₃ (1:10, 1:1.6, 1:1, 1:0.8, 1:0.5, and 1:0), (d) LaCl₃ (1:10, 1:1.3, 1:1.2, 1:1.1, 1:1, and 1:0), (e) KCl (1:1000, 1:100, 1:10, 1:5, 1:1, and 1:0), (f) CaCl₂ (1:20, 1:4, 1:3, 1:2, 1:1, and 1:0), (g) SrCl₂ (1:10, 1:3.4, 1:3.2, 1:3.1, 1:1, and 1:0), and (h) HgCl₂ (1:1000, 1:100, 1:10, 1:5, 1:1, and 1:0) in the plastic centrifuge tubes after centrifuging. The proportion is the molar ratio of **Fol** to metal chlorides.

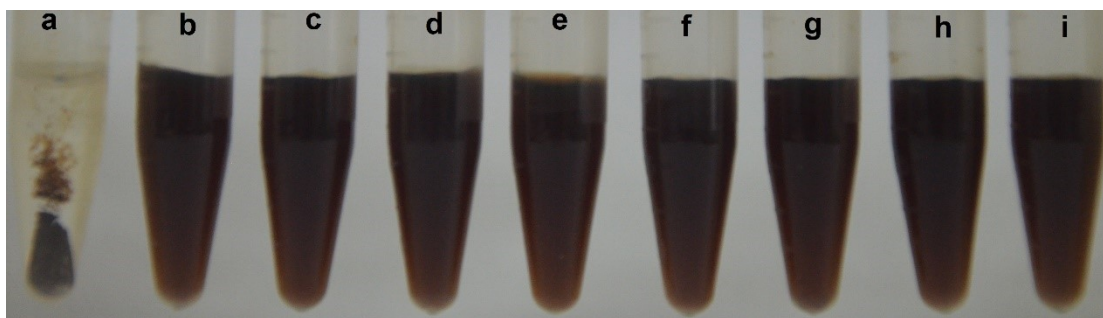


Figure S7 The photographs of aqueous solution of **IFQA** (4.0 mM, 0.5 ml) upon the addition of 1000-fold equivalent volume of HgCl_2 (a), NaCl (b), MgCl_2 (c), AlCl_3 (d), LaCl_3 (e), KCl (f), CaCl_2 (g), SrCl_2 (h), and H_2O (i) in the plastic centrifuge tubes after centrifuging.

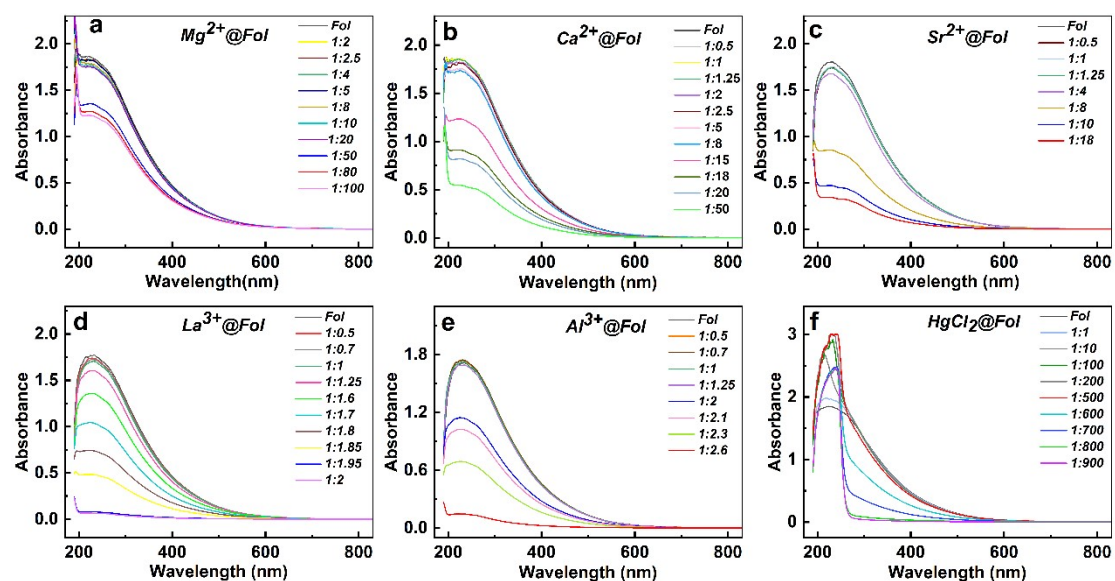


Figure S8. UV-visible spectra of 5-fold diluted supernatant for ternary **Fol**-metal chloride-water systems accompanied by the *Fol:metal chloride* ratio between 1:0.5 to 1:900. The fixed concentration of **Fol** is 0.2 mM. a: MgCl_2 , b: CaCl_2 , c: SrCl_2 , d: LaCl_3 , e: AlCl_3 , and f: HgCl_2 .