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Convenient synthesis and anion recognition property of acylhydrazone-based molecular tweezer receptors

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**Abstract:** Three acylhydrazone-based compounds were designed as novel neutral sensors for anions, and synthesized by simple steps in good yields. Their anion recognition properties were studied by UV-vis and  $^1\text{H-NMR}$  spectroscopy. The results showed that the receptors 1, 2, and 3 all had a better selectivity for  $\text{F}^-$  and  $\text{CH}_3\text{COO}^-$ , but no evident binding with  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{NO}_3^-$ ,  $\text{H}_2\text{PO}_4^-$ , or  $\text{HSO}_4^-$ . The results indicated that anion recognition was achieved via convergent hydrogen bond interactions from acylhydrazone functionality on the side arms. The UV-vis data indicated that a 1:1 stoichiometry complex was formed between compounds 1, 2, or 3 and anions. The binding and selectivity were also tuned by the change of the place of the nitro group attached to the phenyl. Moreover, receptor 3 can act as the colorimetric sensor for such anions as  $\text{F}^-$  and  $\text{CH}_3\text{COO}^-$ , and the recognition mechanism and binding mode were discussed.

**Key Words:** Anion recognition; molecular tweezer; acylhydrazone

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