

キノキサリノン誘導体のカチオン–アニオン認識能と 発光双性イオン性オルガノゲル

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Dual Fluorescent Zwitterionic Organogel of a Quinoxalinone Derivative using Cation–Anion Detection Keys

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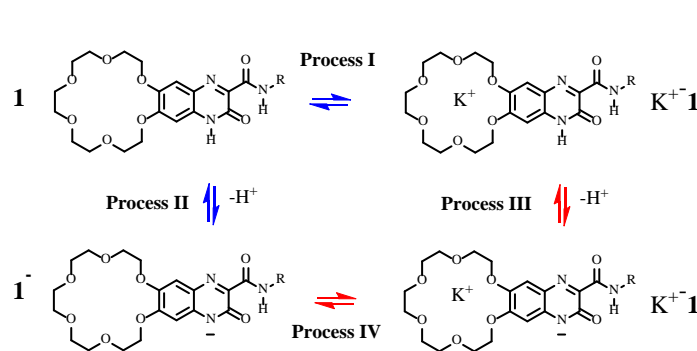


Figure 1. Independent chemical states of [18]crown-6-fused derivative **1** (R = C₁₂H₂₅) with the lactam tautomer and deprotonation at the N–H proton.

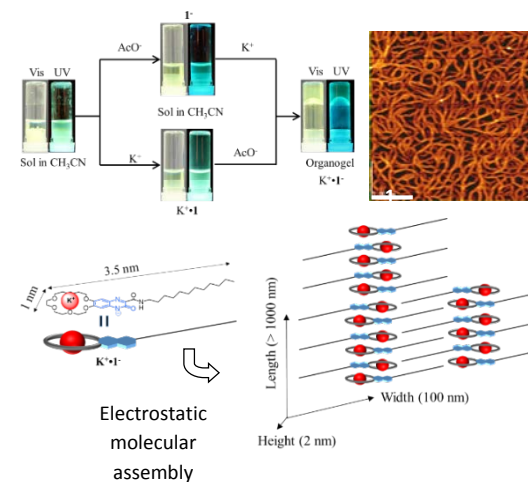


Figure 2. Formation of organogel and nanofibers of zwitterionic K⁺•**1**⁻.

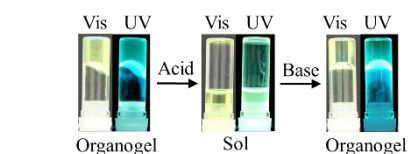
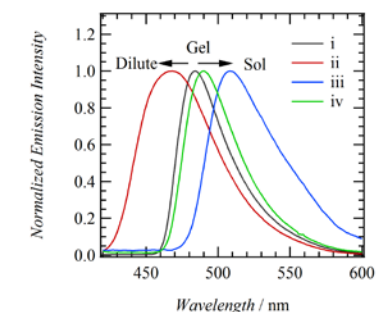


Figure 3. Fluorescence responses of sol–gel transitions in CH₃CN.

[18]crown-6分子を縮合させたカチオン–アニオン二重センシング型の蛍光性キノキサリノン誘導体 (**1**) を新規に合成した。[18]crown-6 エーテル部位にK⁺カチオンを包接したK⁺•**1**⁻の水素結合性のN–Hプロトンは、カチオン–アニオン間の静電相互作用により、F⁻やAcO⁻アニオンに対して高い認識能を示した。静電的に安定化された双性イオンは、CH₃CN、CO(CH₃)₂やTHF中で発光性オルガノゲルを形成し、それは青色発光ゲルから緑色発光ゾルへと外部刺激による可逆的な変化を示した。

An [18]crown-6 unit was introduced into a cation–anion dual-ion-sensing quinoxalinone derivative (**1**) as a new fluorescent molecule for successive cation (K⁺) and anion (F⁻ and CH₃COO⁻) sensing in CH₃CN. High anion-sensing abilities for F⁻ and AcO⁻ were observed at the hydrogen-bonded acidic N–H proton of the positively charged K⁺-capturing **1** at the [18]crown-6 site due to electrostatic cation–anion interactions. Interestingly, the electrostatically stabilized zwitterionic K⁺•**1**⁻ formed fluorescent organogels in CH₃CN, acetone, and THF; the organogels underwent reversible transformation between a blue fluorescent organogel and green fluorescent sol.