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Supramolecular assemblies of triblock copolymers with hexanuclear molybdenum clusters for sensing antibiotics in aqueous solutions via energy transfer

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Abstract

The work introduces the supramolecular assembly of triblock copolymers, namely (PEO)₁₃(PPO)₃₀(PEO)₁₃ (L64), (PPO)₁₄(PEO)₂₄(PPO)₁₄ (17R4), (PPO)₈(PEO)₂₂(PPO)₈ (10R5) and (PEO)₂₁(PPO)₆₇(PEO)₂₁ (P123) with novel cluster complexes [K(diglyme)(CH₃CN)]₂[Mo₆I₁₄] (1) and [K₂(diglyme)(CH₃CN)₅][Mo₆I₁₄] (2) as a route to increase their water solubility. Dynamic light scattering and photophysical measurements reveal the decisive influence of the arrangement of PEO and PPO blocks and of their length on both colloidal and photophysical properties of these solutions. ES-MS data reveal [Mo₆I₁₄]₂- clusters as the predominant form in aqueous solutions of L64 and P123. The steady state and time resolved luminescence data indicate concentration dependent sensitizing of the Mo-centered luminescence through the energy transfer from difloxacin to [Mo₆I₁₄]₂- mediated by the ion-pairing. The impact of both arrangement and length of PEO and PPO blocks in the luminescent response of [Mo₆I₁₄]₂- to difloxacin is discussed. The aqueous solutions of L64 at pH 4 provide the optimal conditions for the sensing of difloxacin through the cluster luminescence. This journal is © the Partner Organisations 2014.

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