FLUORESCENT POLY(COUMARIN TRIAZOLE)S WITH METAL ANION CHEMOSENSINT CAPABILITY

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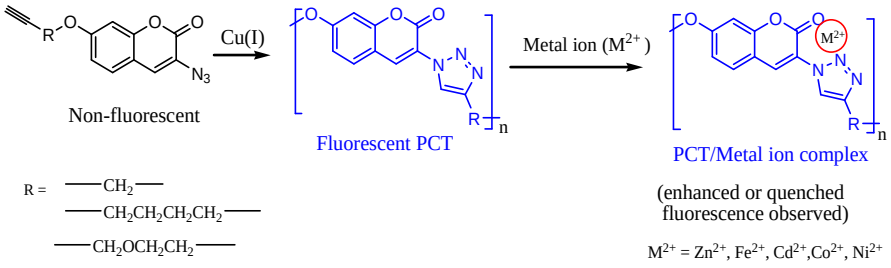
ABSTRACT

Coumarin derivatives are widely used as signalling units in chemosensors due to their interesting properties, such as high emission yields, excellent photostability and an extended spectral range.[1] Their incorporation into polymers (either in the main chain or as pendant group) affords fluorescent polymers with applications in photometry and biomaterials.[1, 2 3] In this work, new fluorescent polymer systems (PCTs) based on the 'coumarin-triazole' functionalities are presented. They are prepared *via* click chemistry based CuAAC A-B step growth polymerization from non-fluorescent coumarin monomer (Scheme 1). The sensitivity of the poly(coumarin-triazole) (PCT) systems to transition metals such as Zn^{2+}, Cd^{2+}, Fe^{2+}, Ni^{2+} and Co^{2+} was explored using fluorescence spectroscopy. The PCTs displayed strong chelation-enhanced fluorescence effect (CHEF) for Zn^{2+} and Cd^{2+}, and a weak chelation-enhanced quenching effect (CHEQ) for Ni^{2+} and Co^{2+}.

Scheme1:CuAAC-based click polymerization and metal ion complexation reactions



Remarkably, the chelation with Fe^{2+} completely quenched the PCT emission as shown in Figure 1. This PCT therefore are potentially applicable as a "turn-off" chemosensors for the detection of Fe^{2+}, a biologically and environmentally relevant metal ion. The emission intensity of PCT–Fe^{2+} system as a function of Fe^{2+} concentration is shown in Figure 1.

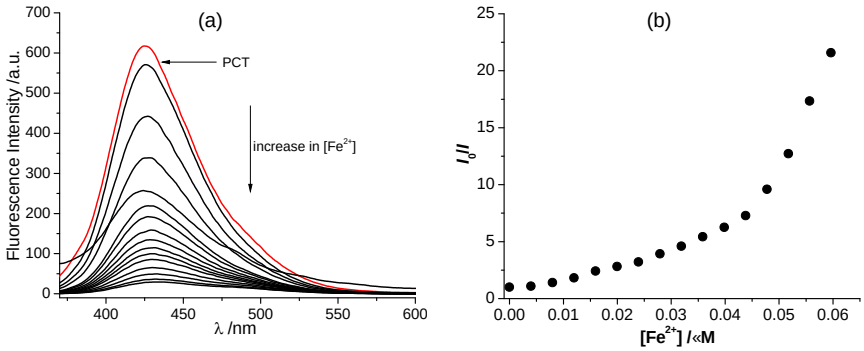


Figure 2: (a) Emission spectra of or PCT/Fe^{2+} complexes in DMF at room temperature as a Function of [fe^{2+}]

References

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