Development of Visible-Light Photoresponsive Self-Assembled Macrocycle Supported on Mesoporous Silica Nanoparticles for Delivery of Therapeutic Ions.

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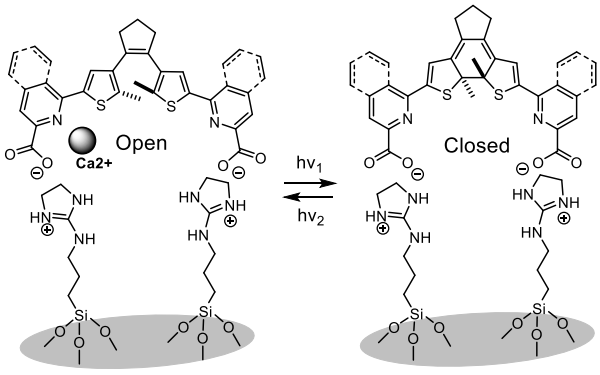
Mesoporous bioactive glass nanoparticles are an important class of therapeutics. It releases vital ions such as Ca^{2+}, which enhances remineralization of hard tissues. Surface modification has shown to improve the ion release; however, the regulated release process remains unachieved. Photoresponsive molecules offers two different structural arrangements with different functions. In the present work, we designed a system based on noncovalent self-assembling of diarylethene carboxylate and guanidinium-doped bioactive glass support to establish a method for regulated release of ions.



We synthesized pyridine based diarylethene system which is active in the UV region and isoquinoline based diarylethene system which is active in the visible-light region. Visible-light active diarylethene systems were constructed through careful introduction of π conjugation. N-Heterocyclic moiety within the diarylethene framework allows controlled chelation/release of ions under light irradiation. The noncovalent self-assembly was generated by anion exchange. This novel material was spectroscopically characterized. Solid state NMR (^{29}Si, ^{13}C), provided crucial information about the self-assembled molecular arrangement.

【ref. This body consists of 156 words.】