Viologen–cycloparaphenylene hybrids: luminescent molecular nanocarbons for anion binding and specific vapor sorption

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Streszczenie

Two viologen-like macrocyclic receptors, [**1**]$^{2+}$ and [**2**]$^{2+}$, merging a bent oligophenylene loop with a (*para*-xylylene)bispyridinium moiety were designed and synthesized. Both dications were derived from the same precursor: the more strained cycloparaphenylene analogue [**1**]$^{2+}$ was obtained using a reductive aromatization, whereas the less curved, *meta*-phenylene-containing [**2**]$^{2+}$ was generated using a double eliminative rearrangement. [**1**]$^{2+}$ is active as a receptor toward pyrene-1,3,6,8-tetrasulfonate, displaying a 2 : 1 binding interaction, with K_{11} = 7.4(3) × 10^3 M^{-1}. In the solid state, [**1**][TFA]$_2$ shows differential sorption of C_6 hydrocarbons and shows reversible sorption of water. [**1**]$^{2+}$ displays yellow emission in solution (λ^{em}_{max} = 544 nm in DMF), which is considerably red shifted in the solid state (λ^{em}_{max} = 644 nm for dry samples). Both [**1**]$^{2+}$ and [**2**]$^{2+}$ undergo electrochemical reduction, yielding transient viologen-like radical cations and diradicals.

Adres publiczny

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Strona internetowa wydawcy

https://www.rsc.org/