Azulene-incorporated 1,3,6,8-Tetraazapyrene derivatives for Optical pH Sensors

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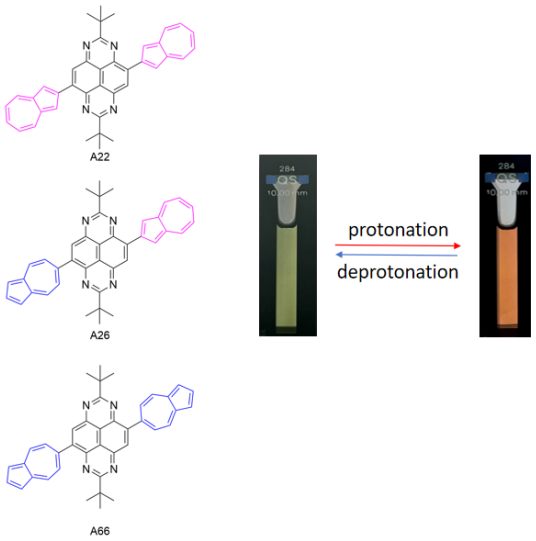
Polycyclic aromatic hydrocarbons (PAHs) are promising materials for controlling charge-transfer pathways within molecular components, rendering them appealing in high-performance organic electronics. Azulene, a non-benzenoid isomer of naphthalene characterized by an electron-rich five-membered ring and an electron-deficient seven-membered ring, exhibits distinctive acid-base responsiveness, making it especially effective in sensor applications.[1] Tetraazapyrene (TAP) can act as a π-electron acceptor in the large conjugated systems.[2 3] Herein, a series of azulene-TAP conjugates have been synthesized successfully (see Figure 1), showing that their HOMO-LUMO gaps can be tuned by changing the connectivity between these two units. Importantly, all of them exhibit reversible colorimetric pH-response behavior. The electronic properties of the resulting donor-acceptor ensembles are described in detail.

Figure 1: Three Azulene-TAP conjugates showing reversible pH responsiveness.



References

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