

Indenoannulated Tridecacyclene: An All-Carbon Seven-Stage Redox-Amphoter

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The embedding of 5-membered rings into a polycyclic aromatic hydrocarbon (PAH) facilitates electron uptake through the formation of aromatic cyclopentadienyl anion-like subunits.^[1] Similarly, 8-membered cyclooctatetraene carbocycles impart redox activity by aromatic stabilization of the respective 6 π electron dication and 10 π electron dianion.^[2] By indenoannulation of the tridecacyclene scaffold,^[3] we strategically combine an octagonal and multiple pentagonal rings to yield a highly redox-active all-carbon scaffold (Figure 1).^[4]

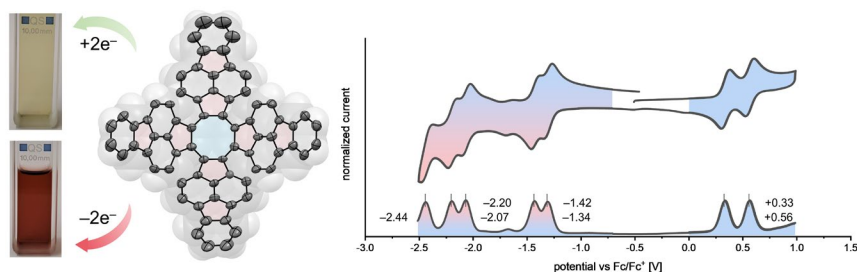


Figure 1: X-ray crystal structure and redox properties of indenoannulated tridecacyclene.

The saddle-shaped PAH undergoes seven reversible redox events comprising five reductions and two oxidations under electrochemical conditions. The properties of the charged species were comprehensively studied spectroscopically and supported by theory.

References:

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