The Effect of Changing Redox-Gradient on Isogeometric Redox-Gradient Dendrimers

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Abstract
Three isogeometric redox-gradient dendrimers (RGD’s) were synthesized. The redox-gradient was altered by synthetically exchanging anisyl groups with benzonitrile groups in the periphery. Larger redox-gradients should improve the charge trapping and charge storage ability of the RGD, thus improving its properties for use as the active material in molecular level information storage media.

4AA/PD Redox-Gradient Dendrimer

CN-4AA/PD Redox-Gradient Dendrimer

8CN-4AA/PD Redox-Gradient Dendrimer

CN-4AA/PD Synthesis

8CN-4AA/PD Synthesis

ESR Spectra

ESR Spectra of all three radical cations show a dominant a(2N) splitting of 5.7 G, indicating that spin/charge is localized on the (red) p-phenylenediamine group.

Redox Gradients and Self-Exchange Rates

Summary

• Cyclic Voltammetry of 4AA/PD (left).
• Models of core (red) and periphery (black/green) above.

• Cyclic Voltammetry of CN-4AA/PD (left).
• Models of core (red) and periphery (blue/green) above.

• Cyclic Voltammetry of 8 CN-4AA/PD (left).
• Models of core (red) and periphery (blue/green) above.

• Charge trapping is improved by increasing the redox-gradient between the periphery and core.

• ESR analysis of the radical cation salts confirms the odd electron and charge resides at the core in these arrays.

• The charge storage properties of these systems make them candidates for new media for charge-based molecular-scale information storage.

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