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TUNING RADICAL INTERACTIONS IN PPH RADICAL DENDRIMERS

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The spin-spin interactions between unpaired electrons in organic diradicals and polyradicals are of crucial importance in many areas, such as organic magnetism, molecular charge transfer, and multiple spin labeling in structural biology. The flexibility of the scaffold and the length of the linker between the unpaired electrons is expected to determine the extension of the spin exchange coupling. Thus, the properties of the scaffold must be carefully considered, when studying the spin-spin interactions in polyradicals. In this context, we have turned our attention to dendrimers, whose end-groups have been coupled to spin probes, allowing their study by electron paramagnetic resonance spectroscopy (EPR). To discover in what magnitude the spin exchange coupling could be tuned by changing the properties of the linker between the radicals and the dendrimer, two generations (G_0, G_1) of polyphosphorhydrazone (PPH) dendrimers were synthesized and fully functionalized with pendant TEMPO radicals via acrylamido (G_n-acrylamido-TEMPO) or imino (G_n-imino-TEMPO) group linkers. The EPR and cyclic voltammetry (CV) studies showed that there existed much higher interactions among pendant group radicals, when bounded to the dendrimer by imino group linkers. This was true in either polar or less polar solvents. To conclude, we were able to drastically change the way that the pendant radicals interacted, by the solely substitution of the dendritic radical linker.

BIOGRAPHY

Vega Lloveras completed her PhD at the Autònoma University of Barcelona, Spain, in 2006. She has a permanent position at the Material Science Institute of Barcelona (ICMAB-CSIC, Spain) in charge of some spectroscopic equipment like Electron Paramagnetic Resonance (EPR). She has 40 publications that have been cited over 1450 times, and her publication H-index is 18.

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