Chemical and Electrochemical retro-cyclopropanation reactions of C_{60}-derivatives

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The electrochemical retro-Bingel reaction was recently reported by Diederich and Echegoyen [1]. The reaction, an electrolytic reduction, removes di[alkoxycarbonyl]-methano adducts to yield the parent fullerenes. The potential for using these addends as protecting groups in fullerene chemistry prompted the use of chemical reaction conditions to effect these transformations [2]. However, the results obtained using ($Mg/HgBr_2$/THF/80° C) were not reproducible in some cases.

We have recently reported how the range of fullerene adducts that can be removed via electrolytic reduction also includes spyromethano-type adducts [3]. In order to investigate the mechanisms and possible applications of these new electrochemical reactions, we have synthesized compounds **1-3** in Figure 1. These compounds have as a common characteristic the nitrophenyl group, which when reduced exhibits a strong and easily recognizable EPR signal.

We have also attempted chemical retro-Bingel reactions with these spyromethanofullerrenes following the synthetic procedures previously described [3]. We have also changed the protocol and introduced 18C6 and the yields are considerably improved and more reproducible. Even in the absence of the highly toxic $HgBr_2$ the reaction works very well. These results will be presented and discussed in detail.

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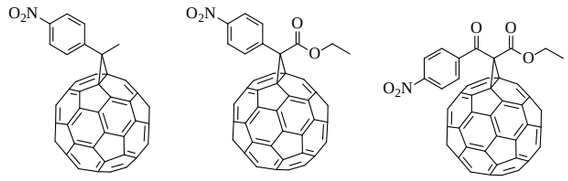

1 **2** **3**

Figure 1. New nitro-compound derivatives **1-3** studied in retro-Bingel processes.