Fullerene-Dibenzo[18]Crown-6 Conjugates: Synthesis and Cation-Complexation Dependent Redox Behavior

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Fullerene-dibenzo[18]crown-6 conjugates of the type shown in Scheme 1 were synthesized by the reaction of C_{60}, sarcosine and octahydro-hexaoxa-dibenzo(A,J) cyclooctadecene-2,13-dicarboxaldehyde according to a general procedure developed for fulleropyrrolidine synthesis. The reaction yielded three geometric isomers whose structures were deduced from *ab initio* B3LYP/3-21G(*) and semi-empirical energy minimization calculations. The alkali and alkaline earth metal complexation of the conjugates were studied by ^{1}H NMR and ESI-mass spectroscopic methods. Cyclic voltammetric studies of the C_{60}-crown ether conjugates in the presence of metal ions revealed anodic shifts up to 60 mV of the first and second fullerene-centered reduction processes due to the electrostatic effects of the metal ions of the crown entity that are in close proximity to the C_{60} spheroid.

Scheme 1