

Synthesis and Lithium Ion Selectivity of Decalino-X-crown-4 (X=12, 13, 14,15)

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Summary

A new class of decalino-X-crown-4 (X=12, 13, 14) (**1**, **2**, **4**) was synthesized in 3.4, 1.8, and 2.0 % yields, respectively, by the reaction of decalin diol (**10**) and corresponding ditosylates **6**, **7**, and **8**, using NaH as a base, NaClO₄ a template, and THF or THF/DMSO mixture a solvent with a high dilution technique.

Alkali metal ion selectivity was determined by means of extraction of alkali metal picrates into dichloromethane as well as selectivity coefficients ($\log K_{Li,j}^{pot}$) of ion-selective electrodes. Although prototype crown ether **17** without any substituent exhibits Na⁺ selectivity and **19** no Li⁺/Na⁺ selectivity in solvent extraction, crown ethers **2** and **4**, each containing one decalin subunit, show good lithium ion selectivity. In accordance with the results of the solvent extraction, all of decalino-crown ethers **1**, **2**, **4** show Li⁺ selectivity in the selectivity coefficients of the electrodes.

As a result, one introduced decalin subunit changes the ion selectivity of prototype crown ethers with 12-15 membered ring from Na⁺ to Li⁺.