

Journal of Analytical Chemistry 2016 vol.71 N14, pages 1352-1359

Comparative analysis of the binding of thiacalix[4]arene-monocrown-ethers with monovalent metal salts using MALDI mass spectrometry

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Abstract

© 2016, Pleiades Publishing, Ltd. MALDI mass spectrometry is used for the first time for the rapid assessment of the binding of thiacalix[4]arene-monocrown-ethers with metal cations (Li, Na, K, Cs, Cu, Ag). The work is performed on examples of thiacalix[4]arene-monocrown-ethers in 1,3-alternate conformation with various numbers (m) of ethylene oxide units and various substituents in phenol groups. It is shown that thiacalix[4]arene-monocrown-ethers with $m = 3, 4, 5,$ and 6 bind lithium, sodium, potassium, and cesium cations, respectively; in addition, the binding of cesium cations is stronger in the presence of aromatic substituents in the lower rim of thiacalix[4]arene-monocrown-ethers. Silver cations bind with calixarenes under study more intensely than copper ions. When aromatic substituents are present, the binding of silver cations is stronger than that of alkali metal ions with the studied thiacalix[4]arene-monocrown-ethers.

<http://dx.doi.org/10.1134/S1061934816140148>

Keywords

MALDI mass spectrometry, monovalent metal ions, selectivity, thiacalix[4]arene-monocrown-ethers