ACTIVE TRANSPORT OF ALKALI METAL CATIONS USING CROWN ETHERS HAVING AN AMINO GROUP

Yohji Nakatsuji and Mitsuo Okahara
Department of Applied Chemistry, Faculty of Engineering, Osaka University,
Yamada-oka 2-1, Suita, Osaka, Japan 565

The development of carboxylic synthetic ionophores has been noticed in relation to mimicking the function of monensin-type antibiotics, which selectively transport alkali metal cations against the concentration gradient.\(^1\) In this case, intramolecular complexation is skillfully used in the uptake process of the cation. We now report a new ion transport system having a device in the release process by using crown ethers having an amino group as ionophore.

![Diagram](image)

Ionophores \(1\) and \(2\) having a primary amino group displayed much better transport ability toward \(K^+\) than ionophore \(3\) having a secondary one or ionophore \(4\) having a tertiary one. It is well known that \(18\)-crown-6 derivatives can complex with primary amines much more effectively than secondary or tertiary ones.\(^2\) So, the good ability of ionophores \(1\) and \(2\) may be ascribed to the presence of intramolecular complexation between \(18\)-crown-6 ring and primary ammonium ion (\(1a\) and \(2a\)) formed in the acidic region.

In addition, ionophores \(1\) and \(2\) revealed an excellent \(K^+/Na^+\) selectivity.

References