

same type of fatty acid distribution; this is true at least for samples isolated from pigeon pancreas,<sup>3</sup> ox-heart,<sup>4</sup> and rat liver mitochondria.<sup>5</sup>

Table 2 very clearly reveals the characteristically high figures of stearic acid on C-1 and arachidonic acid on C-2 of phosphatidyl inositol. This feature appears to be rather general in phosphatidyl inositol from other sources too, and it is interesting that Pascaud proposes specific "structural functions" for glycerophosphatides of stearic-arachidonic acid type.<sup>6</sup>

It remains to be seen whether lysophosphatidyl inositol is really a native component of serum. Had it been more saturated we could have accepted it as a genuine component, but since its fatty acids resemble those of phosphatidyl inositol we cannot exclude the possibility that it was formed artificially during the isolation procedure. The same applies to the lysophosphatidyl ethanolamine which might be an artificial or native degradation product of the corresponding plasmalogen or the diacyl lipid.

1. Renkonen, O. *Acta Chem. Scand.* **17** (1963) 1925.
2. Renkonen, O. *J. Am. Oil Chem. Soc.* **42** (1965) 298.
3. Keenan, R. W. and Hokin, L. E. *Biochim. Biophys. Acta* **84** (1964) 458.
4. Renkonen, O. *Ann. Med. Exptl. Biol. Fennica (Helsinki)*. In press.
5. Johnson, R. M. and Ito, T. *J. Lipid Res.* **6** (1965) 75.
6. Pascaud, M. *Biochim. Biophys. Acta* **84** (1964) 528.

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## Tetraethyl Ammonium Fluoroborate as a Supporting Electrolyte in Polarography

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Quaternary alkyl ammonium halides are currently used as supporting electrolytes in polarography. However, in some cases the halide ions interfere: the halide ions, which are poorly solvated in acetonitrile and in dimethylformamide, are strong bases in these solvents,<sup>1</sup> and in inorganic polarography, the halides sometimes interfere by their tendency to coordinate. These unfavorable effects may be avoided by the use of quaternary alkyl ammonium perchlorates, but the possible dangers in the handling of perchlorates, especially in organic solvents, suggested the use of the corresponding fluoroborates, the fluoroborate ion being isosteric with the perchlorate ion.

The fluoroborate ion has a limiting ionic conductance in ethylene chloride slightly superior to the chloride and the perchlorate ion.<sup>2</sup>

The tetramethyl ammonium cation has a higher ionic conductance than the other tetraalkyl ammonium ions and because of its size would tend to adsorb less at the cathode surface, and so alter the reduction mechanism less than the other alkyl cations.<sup>3</sup> However, because the salts of the tetramethyl ammonium ion are somewhat more associated in a number of solvents<sup>4-6</sup> and less soluble than the corresponding tetraethyl ammonium salts, the tetraethyl ammonium fluoroborate was chosen as a desirable supporting electrolyte.

*Experimental.* Several methods of preparation are reported in the literature.<sup>7-9</sup> We prepared the tetraethyl ammonium fluoroborate by neutralizing a fairly concentrated aqueous solution of tetraethyl ammonium hydroxide with 40 % aqueous fluoroboric acid. After evaporation of the water, the crude fluoroborate, which contained traces of sodium fluoroborate, was purified by recrystallization from ethanol containing approximately 2 % of water. The sodium fluoroborate is less

soluble than the ammonium salt, so the solution was filtered before all of the product was dissolved. The solution was concentrated by evaporation of the solvent until crystals appeared, and the crystals were then allowed to settle. After three recrystallizations the salt showed no reduction wave in dimethylformamide. The salt was stored *in vacuo* over phosphorus pentoxide.

Melting point (corr.): 377–378°C (destruction), 382°C (closed capillary). Literature: 235°C,<sup>2</sup> 365–367°C.<sup>9</sup>

Solubility: Dimethylformamide 25.0°C: 34 g/100 ml; acetonitrile 25.0°C: 71 g/100 ml.

The high solubility of tetraethyl ammonium fluoroborate indicates that the tetramethyl salt might be sufficiently soluble as well.

The salt very easily forms supersaturated solutions. It is non-hygroscopic (no increase in weight after several hours exposure to the atmosphere).

The tetraethyl ammonium fluoroborate has proved to be a very satisfactory supporting electrolyte in dimethylformamide and in acetonitrile, but a diminution of the waves of some carbonyl compounds in a solution of the freshly prepared salt, which is not found when the salt has been

stored *in vacuo* for some days, indicates that the salt should be stored some time before use.

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1. Parker, A. J. *Quart. Rev. (London)* **16** (1962) 163.
2. Thompson, W. E. and Kraus, C. A. *J. Am. Chem. Soc.* **69** (1947) 1016.
3. Missan, S. R., Becker, E. I. and Meites, L. *J. Am. Chem. Soc.* **83** (1961) 58.
4. Sears, P. G., Wilhoit, E. D. and Dawson, L. R. *J. Phys. Chem.* **59** (1955) 373.
5. Kay, R. L., Blum, S. C. and Schiff, H. I. *J. Phys. Chem.* **67** (1963) 1223.
6. Popov, A. I. and Skelly, N. E. *J. Am. Chem. Soc.* **76** (1953) 5309.
7. Wilke-Dörfurt, E. and Balz, G. *Ber.* **60 B** (1927) 115.
8. Wheeler, C. M. and Sandstedt, R. A. *J. Am. Chem. Soc.* **77** (1955) 2024.
9. Wheeler, C. M. and Sandstedt, R. A. *J. Am. Chem. Soc.* **77** (1955) 2025.

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