Electrolytic solutions in ethylene glycol: ultrasonic and positron annihilation studies.

Autorzy

Kazimierz Jerie

Andrzej Baranowski

J. Przybylski

Jacek Gliński

Rok wydania

2004

Czasopismo

Physics Letters A

Numer woluminu

323

Strony

148-153

DOI

10.1016/j.physleta.2004.01.049

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Electrolytic solutions (KCl, KBr, tetra-*n*-butylammonium bromide—TBABr and hydrated cerium(III) chloride—$CeCl_3 \cdot 6H_2O$) in ethane-1,2-diol (ethylene glycol) were studied using sound velocity, density and positron annihilation technique. For simple electrolytes (KCl, KBr, TBABr), effects similar to those known for respective aqueous solutions were observed: the slope of the dependence of sound velocity on salt concentration decreases with increasing size of solvated ion; for TBABr this dependence is even negative. It was also observed that in the latter system the adiabatic compressibility coefficient (calculated from density and sound velocity) is not linear with concentration, suggesting either structural transformations of the bulk solvent or easy formation of contact ionic pairs. Cerium chloride solutions were found to behave different. An anomaly occurs at $CeCl_3 \cdot 6H_2O$ mole fraction between 0.001 and 0.002, again interpreted either in terms of formation of ionic pairs of cations bonded by glycol molecules or cooperative interactions between glycol molecules in the close environment of the cerium ion (in inner solvation sphere) and those in the bulk. Positron annihilation measurements confirm well the conclusions arising from the ultrasonic ones.

Słowa kluczowe

Electrolytic solutions, Non-aqueous solutions, Ethylene glycol, Ethane-1, 2-diol, Density, Sound velocity, Positron annihilation, Structure of liquid, Solvation

Adres publiczny

https://doi.org/10.1016/j.physleta.2004.01.049

Strona internetowa wydawcy

http://www.elsevier.com