

Effect of the structure of functionalized phosphoryl carriers on the membrane transport of proton-donor substrates

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Abstract

A series of phosphoryl compounds functionalized in the side chain were synthesized, and their membrane-transport properties with respect to proton-donor substrates of various acidity were studied. It was found that the efficiency of phase transport of the strong monobasic perchloric acid correlates with the basicity of the phosphoryl carriers in a series of carriers containing oxygen-containing functional groups. The transport flow sharply increases in going to phosphorylated amines, whereas phosphoramidates in their efficiency are closer to phosphonates than to amines. The efficiency of transport of dibasic acids (oxalic and tartaric) is low, since the hydroxy and carboxy groups not bound to the carrier make ionic associates highly hydrophilic. Fine details of the structure-transport activity relationship in the series of phosphorus compounds were discussed. Three-dimensional correlation analysis was used to compare the structure of the carriers with their characteristics: basicity of amine centers, atomic charges of oxygen and nitrogen, and hardness and hydrophobicity parameters. © Nauka/Interperiodica 2006.

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