SORPTION AND SEPARATION OF ENANTIOMERS OF 2-BUTANOL BY CHIRAL POROUS COORDINATION POLYMERS

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Separation of racemates of optical isomers of alcohols is important task for modern pharmacy, agrochemistry and biotechnology, because optical isomers can possess different bioactivity. In many cases separation of racemates is the most efficient method for isolation of pure optical isomers. Determination of factors, which influence ability of sorbent to separate optical isomers, is actual and important task.

In this study we compared the ability of chiral porous coordination polymers (PCPs) to separate racemate of 2-butanol in chromatography (measured as enantiomeric excess, *ee* = 100%×|c(*R*) - c(*S*)|/(c(*R*) + c(*S*)), where *c* is concentration of respective isomer in liquid after chromatography), and the difference between sorption of pure optical isomers (measured as enantioselectivity, *es* = a(*R*)/a(*S*), where a is the mass of isomer, absorbed from gaseous phase at certain pressure). Sorption of pure optical isomers of 2-butanol was studied by analysis of sorption isotherms from gas phase separately for (*R*) and (*S*) isomers. The efficiency of racemate separation was analyzed by such racemate passing through a column, filled with respective PCP, and *ee* was determined in several consequent portions of liquid, leaving the column. It was found that for a row of studied PCPs *ee* values increased along with *es* values for the same sorbent (Fig. 1). Such dependency can be caused by dominating role of thermodynamic factors in enantiomers separation both in sorption from gaseous phase and in chromatographic separation in conditions close to equilibrium ones.

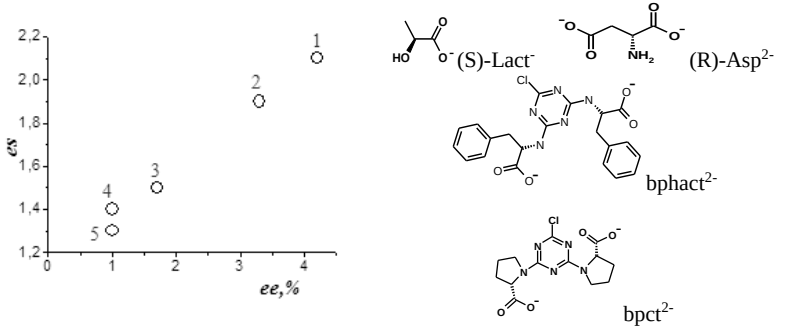

Fig. 1. Comparison of *ee* and *es* values for PCPs $[Zn_2(bdc)((S)\text{-Lact})(DMF)]_n$ (1; bdc^{2-} = 1,4-benzenedicarboxylate), $[Co((S)\text{-bpct})(H_2O)_2(MeOH)]_n$ (2), $[NaFe((S)\text{-Lact})((S)\text{-LactH})_2(H_2O)_2]_n$ (3), $[Ni_2(R)\text{-asp})_2(bipy)\cdot 1.28CH_3OH\cdot 0.72H_2O]_n$ (4), $[Co((S)\text{-bphact})(H_2O)(MeOH)_2]_n$ (5)