

**SELECTED OPTICALLY ACTIVE PHOSPHORGANIC THIO- AND SELENO  
ACIDS AND THEIR SALTS: SYNTHESIS, STRUCTURAL RESEARCH AND THE  
USE IN NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY ALSO IN  
ASYMMETRIC SYNTHESIS**

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Determination of enantiomeric excesses (*ee*) is most easily achieved by *in situ* conversion of a mixture of enantiomers into dynamically equilibrated diastereomeric forms that are distinguishable in NMR spectra. For this purpose, chiral solvating reagents (CSA) like (-)-(*S*)- and (+)-(*R*)- *t*-butyl(phenyl)phosphinothioic acid can be used. Introduction of an extended  $\pi$  electron system in *t*-butylarylphosphinothioic acids compounds is an effective method to improve their performance as a CSA. Therefore, the development of efficient methods for the synthesis of racemic *t*-butylarylphosphinothio(seleno)ic acids, and then their separation into the appropriate enantiomeric forms was the main goal of the research.

The obtained optically active thio- and selenoacids were subjected to X-ray structural analysis, which allowed to precisely determine the structure of their molecules. This determination was important from the point of view of their use as a new family of chiral solvating agents (CSA) in NMR spectroscopy. In addition, attempts were made to use chiral *t*-butyl(phenyl)phosphinothioic acid and its salts as chiral auxiliaries in asymmetric synthesis.

Salts of racemic and optically active acids and *t*-butyl(phenyl)phosphinothioic acid with optically active and racemic amines have also been obtained as potential chiral ionic liquids (CILs). In addition, research was conducted on the use of chiral thio(seleno)organophosphoric acids and their salts as chiral auxiliary substances in asymmetric synthesis. The *t*-butyl(phenyl)phosphinothioic acid was used as an inducing reagent in addition 1,4 to  $\alpha$ ,  $\beta$ -unsaturated ketones, in which the reduction of the obtained product should lead to chiral alcohols. Attempts to isolate the addition products indicate that the reaction is an equilibrium reaction because the sole evaporation of the solvent from the reaction mixture led to a mixture of compounds: (+)-*t*-butyl(phenyl)phosphinothioic acid and the addition product.