

Summary of the doctoral dissertation: Studies on the oxidation of cyclohexane and cyclohexanone with oxygen to adipic acid in the presence of *N*-hydroxyphthalimide

Studies on oxidation reactions of cyclohexane and cyclohexanone with oxygen in the presence of *N*-hydroxyphthalimide as a catalyst were the subject of the doctoral thesis. The main aim was to determine the possibility of obtaining adipic acid from cyclohexane by direct or two-step method using the *N*-hydroxyphthalimide organocatalyst.

The first part of the work involved research on the effect of the system composed of *N*-hydroxyphthalimide, cobalt(II) and iron(II) 2-ethylcaproate, on the cyclohexane oxidation reaction with air to cyclohexyl hydroperoxide, cyclohexanol and cyclohexanone. The aim of these studies was to improve the technological indicators (conversion, selectivity, the ratio of the obtained ketone to alcohol) under conditions similar to industrial ones.

The next stage of the work included studies on air oxidation of cyclohexanone to adipic acid, in acetic acid as a solvent, in the presence of acetates and acetylacetonates of transition metals. The purpose was to replace the hitherto used HNO_3 by air in the cyclohexanone oxidation reaction. The use of air contributes to reducing of nitrogen oxides formation, which significantly improves the environmental aspect.

Studies have also been carried out on the direct oxidation of cyclohexane to adipic acid. The reaction was carried out in acetic acid as a solvent in the presence of manganese and/or cobalt acetylacetonate and *N*-hydroxyphthalimide as catalysts. The aim of these studies was to obtain adipic acid directly from cyclohexane in mild conditions. This solution, comparing to the industrial one, would significantly simplify the process of obtaining adipic acid from cyclohexane.