

## APPLICATION OF MICROWAVE IRRADIATION TO RAPID TRANSFORMATIONS OF ORGANIC COMPOUNDS AND MACROMOLECULES.

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Heating in microwave ovens uses the ability of some liquids and solids to transform electromagnetic energy into heat and thereby drive chemical reactions. Since observed thermal effect depends on the properties of material exposed to microwave irradiation (materials for chemical reactions do not interact equally with the commonly used microwave frequencies), it is possible to change the reaction selectivity and obtain an alternative product distribution in comparison to the reaction carried out under conventional conditions.

In the present work, microwave-assisted organic synthesis is presented in the context of the most significant examples that were performed in our lab. The work consists of two parts.

In the first part, there are shown investigation on the synthesis of organic compounds, whereas in the second part we concentrated on the study on the synthesis and modification of macromolecules.

Table 1. Representative Organic Compounds and Macromolecules.

<b>Organic compounds</b>	<b>Macromolecules</b>
Alkylation of azaheterocycles	Epoxy resins (solid)
Williamson reaction – Ethers	Polyesters
Condensation reactions – coumarins and benzofurans	Polyethers
Oxidation of alcohols	Poly(aspartic acid)
Epoxidation of double bounds	Polyphosphazenes
Oxyhalogenation of arenes	
Phthalocyanines synthesis	

It was found that the application of microwave heating coupled with solvent-free conditions have significantly accelerated the rate of the reactions. Kinetics investigation and thermal effects during microwave irradiation are presented as well.