„Studies on the formation and reactivity of 2-nitrosodiarylamines, and on their use in the synthesis of polycyclic heterocyclic compounds, phenazine derivatives”

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The PhD dissertation presents a study on the field of a not so widely explored method of the aromatic substitution of hydrogen with aromatic amines, proceeding at the expense of a reduction of a nitro group to a nitroso group. In that respect extensive examinations of the recently discovered synthesis of *N*-aryl-2-nitrosoanilines from a wide variety of nitroarenes with different reactivity, and a number of mono- and polycyclic aromatic amines, were undertaken. It has allowed to enhance our knowledge about how to efficiently synthesize *N*-aryl-2-nitrosoanilines variously substituted in both rings, and let to eliminate side effects, limiting the scope of the reaction. Furthermore, several problems related to the detailed mechanism of the reaction have been solved.

Synthesis of a wide variety of *N*-aryl-2-nitrosoanilines allowed to determine their reactivity with nucleophilic reagents, particularly in the reaction of substitution of nucleofugal groups, strongly activated by the nitroso group. As a result, suitable conditions for the nucleophilic substitution of halogen atoms were found and a significant *para*-regioselectivity of the reaction was revealed. The method was then used for transformations of *N*-aryl-2-nitrozoanilines by selective replacing halogen substituents with numerous oxygen and nitrogen nucleophiles. Some experiments were also performed in order to find a source of the unexpected regioselectivity of the reaction.

The neighborhood of two nitrogen groups of opposite reactivity was employed for regioselective building of a new, fused heterocyclic ring by way of an intramolecular cyclization leading to derivatives of phenazine and their aza- analogues. The reaction was examined under various conditions. Its mechanism, reactivity and regio- and chemoselectivity were analyzed in respect of the observed catalysis by acids, bases and Lewis acids. On the basis of the obtained results, new procedures for the synthesis of some precursors of biologically important compounds such as 1-, and 2-methoxyphenazine were developed. The observed efficiency of the reactions were higher than that of the methods known so far.