

Reactions of benzyl carbanions analogues with nitroarenes directed towards synthesis of condensed heterocyclic systems.

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Polycyclic azaarenes belong to an interesting group of compounds which find numerous applications, among others: as medicines, plant protection agents and structural units in organic semiconductors or OLED diodes.

The aim of the doctoral thesis was to develop methods for the synthesis of condensed nitrogen heterocyclic systems. The task was realized using the reaction of nitroarenes with heterocyclic analogs of benzyl carbanions, which was carried out in the presence of Lewis acid. The key step in these transformations was the formation of a pyridine ring as a result of cyclisation of the nitroso compound that was formed *in situ* from the σ^H -adduct - constituted in the initial stage of the reaction as a result of the addition of carbanion to the *ortho* position of nitroarene.

There was developed an effective methodology for the synthesis of a wide range of tri-, tetra- and pentacyclic azaarenes – among them especially interesting: indolo [2,3-*b*]quinoline derivatives (norcryptotackeines), indolo[3,2-*b*]quinolines (cryptolepines) and [1]benzo-thieno[2,3-*b*]quinolines. There were used two strategies to conduct the reaction of the synthesis of these condensed systems: *step-by-step* and *one-pot* methodology, in which as substrates were utilized: mono- and bicyclic nitroarenes and precursors of heterocyclic analogs of benzyl carboanions (also mono- and bicyclic), among them: 2 and 3-indolylmethyl or 3-thionaphtenylmethyl.

The developed reactions can be a good alternative to methods of synthesis heterocyclic systems known from the literature, due to the mild conditions of transformation, good availability of precursors and obtained high yields. Moreover no transition metals are used at any stage, which is particularly important in the synthesis of biological active compounds, that can be used in the pharmaceutical industry.