

## *Summary of doctoral thesis*

*„Building blocks for pharmacy and chemistry synthesized by heterogeneous catalysis in the nano-Pd/Cu system”*

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Nanocatalytic system has been investigated in synthesis of selected compounds with potential application in pharmacy and chemistry.

The study goal was to determinate the catalytic activity of various bimetallic materials consisting of Pd nanoparticles on the target carriers, such as Ag, AgO, Cu, CuO, Ni. The assays were performed in Sonogashira coupling as a model reaction. This allowed to select the active catalyst, i.e., nanosized palladium particles dispersed on the electrolytic copper (Pd<sub>NPs</sub>/Cu). The method for the preparation of the catalyst and its modification was investigated. In a series of further studies different types of reactions using Pd<sub>NPs</sub>/Cu catalyst were tested. The results that were obtained show high activity of the studied catalyst in the reactions of terminal alkynes with halogen derivatives. The examples of such reactions are: Sonogashira and Cadiota-Chodkiewicz cross coupling and cycloaddition azide-alkyne. In the course of the studies, a potential factors affecting high catalytic activity Pd<sub>NPs</sub>/Cu were identified. Sonogashira coupling products were used for the preparation of the new styrylquinolines which have been described as new group of fluorescent dyes suitable for microscopic imaging of biological structures.

The structure of all compound was confirmed by <sup>1</sup>H and <sup>13</sup>C NMR, ESI-MS analyses, while the purity of a compound was confirmed by: ED-XRF, ICP-MS, HPLC. The obtained catalysts were characterized by means of XPS, TEM, SEM + EDX, XRD.