This work is focused on synthesis of new modular components (molecular wires, insulators, diodes, sensors and self-assembled compounds), which may find application in molecular electronics.

In the first part of this work, procedure for the preparation of "molecular wires", based on the oligomers of pyridinium salts, is described. The synthetic strategy is based on a stepwise prolongation of these rodlike molecules by reaction of terminal amino group with the monofunctional units**.** The series of pyridinim oligomers of well-defined length have been prepared without complicated separation of complex mixtures of oligomers. The following part of work describes synthetic approach for the preparation of pyridinium oligomers ending with alkylsulfanyl or acetylsulfanyl groups. These compounds are further used to study the conductivity of conjugated oligomers, after anchoring between the gold electrodes.

The following section deals with the preparation of "molecular insulators" based on a rigid bicyclo[2.2.2]octane, 1,12-dicarba-*closo*-dodecaborane and 1,10-dicarba-*closo*-decaborane units.

The next part deals with the preparation of a series of five „molecular diodes“, where the acceptor part (pyridinium monomer) and donor part [(η^4-tetraarylcyclobutadiene)(η^5-cyclopentadienyl) cobalt complex] are mutually separated by a series of „molecular insulators“.

The following section deals with the preparation of cross shape derivatives of (η^4-tetraarylcyclobutadiene) (η^5-cyclopentadienyl) cobalt complexes, which were linked through the active part, which was either 1,10-phenanthroline or 2,2´-bipyridyle unit. A series of molecular sensors have been prepared.

In the last section is described the preparation of self-assembled derivatives of (η^4-tetraarylcyclobutadien) (η^5-cyclopentadienyl) cobalt complexes, and possible substitution of cyclopentadiene ring was discussed.

The separate part is focused on the physico-chemical properties of the prepared compounds. Pyridinium oligomers have been studied using a variety of spectroscopic (pulse radiolysis, UV, IR, NIR, EPS) and electrochemical methods. All other derivatives (molecular wires, isolators, diodes, sensors, etc.) are studied in collaboration with other research laboratories (Boulder, Brookhaven, USA, Prague).