Abstract

A new type of organometallic polymer networks with a covalent structure of cross-linked substituted polyacetylenes containing Cu^{2+} or Pd^{2+} ions (5 to 17 wt%) has been developed. The metal ions were complexed in the networks predominantly with two *N*-salicylideneaniline ligands covalently bound to two different network monomeric units. Due to the chosen method of complexation, the metal ions have actively participated (as knots of the network) in the formation of cross-linked architecture of the products. For the preparation of organometallic networks two independent methods were used: (i) the direct polymerization of organometallic monomers and (ii) the two-stage method using postpolymerization introduction of metal ions into polyacetylene polymers containing covalently bound *N*-salicylideneaniline proligands. The starting low-molecular-weight blocks used for the network synthesis were new substances prepared within the framework of the diploma thesis, namely monomers of the mono- and diethynylated *N*-salicylideneanilines type and diethynylated organometallic monomers in which two molecules of a monoethynylated *N*-salicylideneaniline complexed one Mt^{2+} ion. The ethynylated monomers were polymerized to organometallic networks or precursors of these networks via chain-growth coordination polymerization, in which the ethynyl groups of the monomers were transformed into vinylene units of the networks. In order to achieve the microporosity and higher values of specific surfaces of the prepared networks, the copolymerization mode of the synthesis was found to be suitable. This approach provided the organometallic networks in which the cross-linking through metal ions was combined with a cross-linking through arylene links generated from diethynylarene comonomers. In this way, the organometallic polyacetylene networks with the values of specific surface area up to 651 m^2/g were prepared.