

## Abstract

Series of new micro/mesoporous polymer networks with high content of pyridine segments was prepared. For the preparation were used ethynylpyridine type of monomers which were successfully homopolymerized and copolymerized with hydrocarbon diethynylarenes by chain-growth coordination polymerization catalyzed with [Rh(NBD)acac] complex. Polymerizations provided polyacetylene networks with main chains densely cross-linked by pyridine or arylene links. Prepared pyridine networks showed specific surface area  $S_{\text{BET}}$  from 308 m<sup>2</sup>/g to 923 m<sup>2</sup>/g and variable content of pyridine segments in an interval from 3,27 mmol/g to 7,86 mmol/g. In networks, pyridine segments made part of interchain links or side groups.

Networks with pyridine segments were successfully quaternized by heterogeneous postpolymerization reaction with bromoethane to form well covalently defined networks containing *N*-ethylpyridinium segments. Quaternized networks containing pyridinium segments in amount from 2,41 mmol/g to 4,24 mmol/g had preserved micro/mesoporous texture with values of  $S_{\text{BET}}$  from 331 m<sup>2</sup>/g to 592 m<sup>2</sup>/g. Polyacetylene networks with *N*-ethylpyridinium segments were prepared also by catalyst-free (spontaneous) quaternization polymerization of diethylpyridines. These networks were worse covalently defined and had proved lower values of specific surface area. Prepared networks with pyridine and *N*-ethylpyridinium segments were provided to cooperating workplace and successfully tested as heterogeneous catalysts for reaction of styrene oxide with carbon dioxide and as sorbents for reversible water capture from the gas phase.