

ABSTRACT

The phenylacetylene type monomers with benzene ring substituted with one or two aldehyde groups (besides an ethynyl group) were efficiently polymerized into linear mostly high-molecular-weight polyacetylenes with aldehyde groups in pendants if the complex [Rh(NBD)acac] was used as the polymerization catalyst. To achieve high yield and molecular weight of the polymer the positioning of the aldehyde group to *meta* position with respect to the ethynyl group was most appropriate. It was confirmed that polyacetylenes with aldehyde groups were modifiable by a reaction with *p*-toluidine under formation of Schiff base type pendant groups.

1,3-Diethynylbenzenes with various substituents in position 5 on the ring (R = H, F, Cl, Br, HCO, NO₂, COOCH₃) were efficiently polymerized with [Rh(NBD)acac] catalyst into microporous or micro/mesoporous polyacetylene networks that exhibited specific surface area from 311 to 1146 m²/g. In the case of the networks with HC=O groups, the positive effect of these groups was confirmed on the capacity of the network in CO₂ and methanol vapor capture. The composition and texture of the networks possessing HC=O groups were partly reversibly modifiable in reaction with *p*-toluidine.