Synthesis of Conjugated Polyester from Propargyl Benzoate by Transition Metal Catalysts

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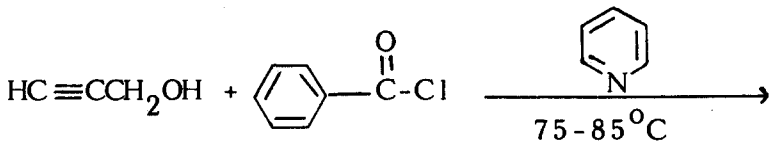
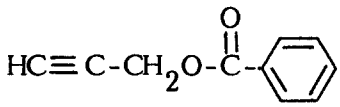
The polymerization of acetylene and its derivatives is one of the fundamental methods for the synthesis of polymers with conjugated polyene, which are beginning to be used at present time as organic semiconductors and metals. In present study, the synthesis and properties of poly(propargyl benzoate) will be discussed.

The propargyl benzoate, monomer, was prepared by the reaction of propargyl alcohol and benzoyl chloride as following reaction scheme I.



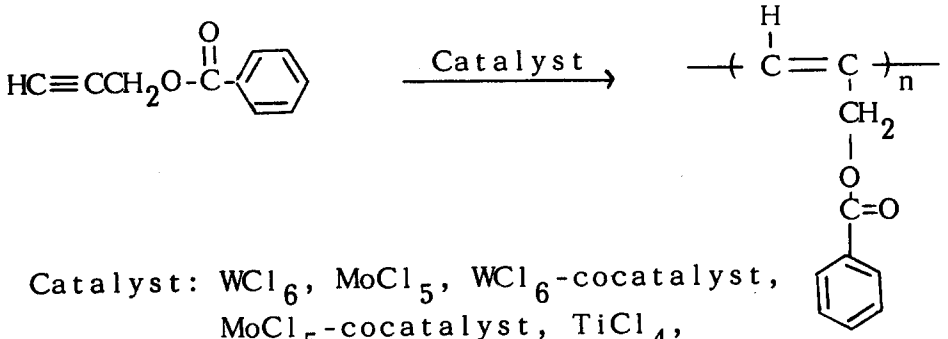


Propargyl Benzoate

Scheme I

The polymerization of propargyl benzoate was carried out by various transition metal catalysts such as WCl_6,

$MoCl_5$, $TiCl_4$, and $PdCl_2$ as following reaction scheme II.



Catalyst: WCl_6, $MoCl_5$, WCl_6-cocatalyst, $MoCl_5$-cocatalyst, $TiCl_4$, $PdCl_2$, etc.

Scheme II

The structure of resulting poly(propargyl benzoate) was characterized by nuclear magnetic resonance(^1H- and ^{13}C-), infrared spectroscopy, UV-visible spectra, and elemental analysis. The poly(propargyl benzoate) was completely soluble in benzene, toluene, DMF, nitrobenzene, CS_2, etc. A characteristic peak of conjugated polymer, broad and weak $\pi \rightarrow \pi^*$ transition appeared in the UV-visible spectrum of poly(propargyl benzoate).

Thermal and electrical properties of the resulting polymer will also be discussed