

SYNTHESIS AND CHARACTERISATION OF OLIGO(PHENYLACETYLENE)

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ABSTRACT

The discovery by Reppe [1] that the oligomerisation of acetylene to cyclooctatetraene (70 % yield) occurs under relatively mild conditions in the presence of Ni(II) salts stimulated an enormous interest in transition metals as catalysts for oligomerisation. Modification of the Ni(II) catalyst lead to the formation of mixtures of aromatic trimers and linear polymers [2-4]. Subsequently the oligomerisation of alkynes has been studied extensively. It has been found that the complexes of nickel, palladium and platinum are excellent catalysts for oligomerisation of alkynes [5].

Although reactions involving palladium should be carried out carefully, palladium catalysts are not very sensitive to oxygen and moisture, or even to an acid. Ni(0) complexes are extremely sensitive to oxygen. On the other hand, in many reactions catalysed by palladium-phosphine complexes, it is enough to avoid the oxidation of the phosphine. Palladium is a noble metal and expensive, but it is much cheaper than platinum. Also, the toxicity of palladium has posed no problem so far. The fact that a number of industrial processes based on palladium catalysed reactions have been developed and are now in operation, reflects these advantages of using palladium catalysts commercially [6].

In this study the oligomerisation of phenylacetylene using phenylpalladium complexes with alkylthioethercarboxylate S-O ligands was investigated. A variety of these catalysts were investigated at different reaction conditions. Two fractions of oligomeric products formed, i.e., a methanol soluble and a methanol insoluble fraction. Both fractions of oligomeric products were characterised by IR, GPC, SEM and TG.

References:

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