Table 2 Effect of solvents on $CuCl_2/AlEt_2Cl$ catalyst system for styrene polymerization

Solvent	ϵ	% Conversion	Reaction time (hours)
n-Hexane	1.89	38.8	0.5
Benzene	2.28	43.0	0.5
Toluene	2.37	36.5	0.5
Bromobenzene	5.40	29.7	0.5
Chlorobenzene	5.62	24.4	0.5
$C_2H_4Cl_2$	10.36	47.9	0.5

$CuCl_2 + AlEt_2Br$ catalyst system for the polymerization of styrene[2]. The rate does not become constant after adding the specific amount of PPh_3 as was seen previously[2]. Hence the conclusion can be drawn, that PPh_3 forms a complex with copper chloride and inhibits the polymerization.

Ethers as additives were studied in detail by Cunningham[4] and Gippin[5]. Different products have been identified in the reactions of ether with Ziegler–Natta type catalysts. The effect of these products mainly govern the reaction rate. The efect of anisole can be explained on the basis of its reaction with $AlEt_2Cl$ which may give various products which retard the polymerization. Gippin[6] observed no change in the rate at optimum catalyst ratio when diphenylether (DPE) was added as an additive. The present study also confirms the same observations.

Pyridine and triethylamine totally inhibit the polymerization as in the case of $CuCl_2 + AlEt_2Br$ system[2]. Hydroquinone also did not effect the rate indicating absence of free radicals.

As can be seen from *Table 2*, the results obtained in solvents of varying dielectric constant indicate a decrease in conversion with increase in dielectric constant. The halogenated aliphatic solvents again indicate higher yields than expected on the basis of their dielectric constants. This has also been observed and explained earlier[2].

CONCLUSIONS

Above studies indicate that the mechanism of polymerization of styrene by $CuCl_2 + AlEt_2Cl$ catalyst system is of the anionic coordinated type, though the activation energy is low.

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Publisher's announcement

Extra issue scheduled for July 1982

The publisher is pleased to announce that subscribers will receive thirteen issues of POLYMER in 1982 instead of the usual twelve.

The extra issue, which is scheduled for July 1982, will be included at no additional cost in the subscription price and will aim to speed up publication times of papers submitted to POLYMER.

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