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## **"Development of methods for the synthesis of bisphenol F (dihydroxydiphenylmethane isomers) in acidic media."**

### **Summary**

Attempts have been made to obtain bisphenol F (a mixture of isomers of dihydroxydiphenylmethane) in acidic media. The reactions were performed in the presence of homogeneous acid catalysts such as: oxalic acid, p-toluenesulphonic acid, combined catalysts (magnesium acetate together with methanesulfonic acid) and heterogeneous sulphonate ion exchangers.

About 7.0 tons of a 50% solution of bisphenol F in isopropanol were obtained. Discoloration of 50% bisphenol F solution in isopropanol from Gardner color 7.0 to the required level 3.0 using sodium borohydride. The product sample was transferred to Z.Ch. "Organika-Sarzyna" S.A. in Nowa Sarzyna to obtain an epoxy resin. The obtained product (epoxy resin) based on bisphenol F, met the requirements in terms of viscosity.

Research has been carried out to obtain a solid bisphenol F in the form of a "paste" and in a granular form with a repeatable chemical composition.

BPF crystallizations were carried out using various organic solvents:

- toluene (fractionated):
- ethylbenzene,

and from water. The product was obtained with a content of the 4,4'-BPF isomer of approx. 85%.

The tests characterizing BPF were performed using (TG) thermogravimetry and (DSC) differential scanning calorimetry. Based on the obtained results obtained by DSC, a method for solidifying BPF was developed. The two-component phase diagrams 2,2'-BPF - 4,4'-BPF and 2,4'-BPF - 4,4'BPF have been determined, determining their melting points at the appropriate quantitative compositions.

Attempts have been made to obtain bisphenol F from phenol and formaldehyde using organometallic catalysts (zinc acetate and magnesium acetate) and methanesulfonic acid (KMS). As a result of the research, products with a high content of 2,4'-BPF > 60%, 2,2'-BPF > 30% and in significant amount of isomer of 4,4'-BPF < 1% were obtained.