Doctoral Thesis

A survey of methacrylic acid and its derivatives as synthetic resins

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A SURVEY OF METHACRYLIC ACID AND ITS DERIVATIVES AS SYNTHETIC RESINS

VON DER EIDGENÖSSISCHEN TECHNISCHEN HOCHSCHULE IN ZÜRICH ZUR ERLANGUNG DER WÜRDE EINES DOKTORS DER TECHNISCHEN WISSENSCHAFTEN GENEHMIGTE PROMOTIONSARBEIT VORGELEGT VON

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Referent: Herr Prof. Dr. H. E. Fierz
Korreferent: Herr Prof. Dr. L. Ruzicka

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CONCLUSION

In making a survey of methyl methacrylate and similar compounds, various processes have been tried, and the best chosen for the preparation. The preparation of \( \alpha \)-hydroxyisobutyric compounds, and their conversion by dehydration to the methacrylic series, and the preparation of the \( \alpha \)-chlor-isobutyric series and conversion to the unsaturated series by dehydrohalogenation have been found to be unsatisfactory. The method which gave the best results in the laboratory is the direct conversion of the cyanohydrin by means of one hundred per cent. sulfuric acid at temperatures not over 80°, with subsequent addition of water and alcohol to form the amide, acid, esters, and salts, of the methacrylic acid series. The corresponding tiglic series was also prepared in this manner.

The second part of the work is a survey of the polymerization of the methacrylic and tiglic compounds. The general processes of polymerization, casting, solution of monomer, dispersion of monomer, have been carried out with catalysts to determine the effect of such factors as catalyst, temperature, and time for polymerization, and to determine the best process. Each of the methods is useful, castings for making products directly, solutions and dispersions for molding powders. The best catalyst is found to be benzoyl peroxide, the best temperature between 60° and 100°. The time is proportional to the catalyst and temperature. The methacrylate series gives the best polymers.