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11. Studies on Silicone Resins. (XII)

On the Dielectric Properties. (3)

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In this Bulletin (25, 57, 1951), we pointed out that the OH radical would play the part of dipolar radicals in the silicone resin.

In this report, the relation between static dielectric constant and number of OH radical of silicone resin are discussed.

Since the viscosity of the sample is very high, a conical electrode for measuring dielectric constant has been designed. The number of OH radical in silicone resin is measured from the next chemical reaction: the OH radical in organosiloxane reacts with CH_3MgI and produces CH_4 which is quantitatively measured.

When resin is cured at low temperature, its static dielectric constant varies with the number of OH radical, but on the static dielectric constant of the resin cured at high temperature, it is hard to have certain relation to the number of OH radical. At a certain number of OH radical its static dielectric constant begins to decrease rapidly, while decrease of OH radical is few. On the other hand the relation between the number of OH radical and the decrease of weight was investigated, and it was found that when the resin was cured at high temperature, the above-mentioned relation coincides fairly well with the theoretical relation in poly-condensation process, but when it was cured at low temperature, the degree of weight decrease became larger than the theoretical value. This phenomenon will give a key to the investigation on the oxidation of silicon resin. And it is considered that the decreases of weight and static dielectric constant are due to the decomposition of alkyl radical.

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In this report, the temperature characteristics of dielectric loss of silicone