The Monolayer of Cresol Resin.*

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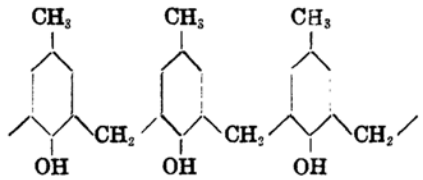
The polymers from para-substituted phenols and formalin can make monolayers according to their linear structures.

The structure of the condensed polymer of *p*-cresol and formaldehyde is presumed chemically as



(1)

If it has actually such a structure, all OH groups in the monolayer are oriented to the water surface because of their hydrophilic nature, and the linear chain lies on the surface thrusting upwards the hydrophobic methyl groups. It is verified by experiments.

We make the monolayer by dropping the chloroformic solution of the polymer on the water and measure the relation between the surrace area and the surface pressure. The film is a condensed film. The area per phenolic radical is equal to those of *p*-alkyl phenols studied by Adam.[1] It is an evidence of the orientation of the phenolic groups on water.

* Read before the annual meeting of the Society on april 3, 1948

(1) N. K. Adam, "The Physics and Chemistry of Surfaces" 50, Oxford (1938).

For rigorous confirmation we measured the surface pressure of dimer, trimer, tetramer, pentamer, hexamer and heptamer:

$$(CH_3C_6H_3\underset{OH}{}CH_2)(CH_3C_6H_2\underset{OH}{}CH_2)_n(CH_3C_6H_3OH), \qquad n=0, 1,2, 3, 4, 5.$$

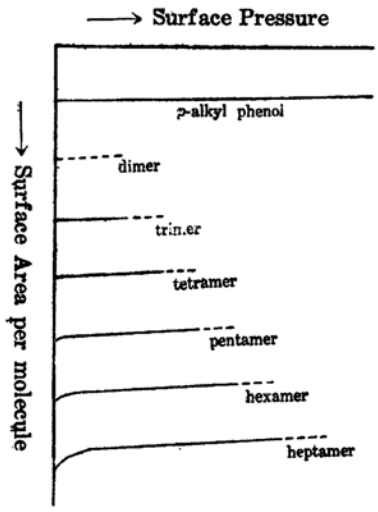


Fig. 1.

The results are shown in Fig. 1.

We can conclude that the structure of the oil-soluble phenolic resin is the linear form of (1).

The alcohol soluble polymer of phenol and formalin obtained by acidic catalysis, can never spread into monolayer. This means that the structure of the resin is quite different from that of *p*-cresol resin.

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