COMMUNICATIONS TO THE EDITOR

THE ELECTRICAL CONDUCTIVITY OF SILICIC ACID GEL MIXTURES DURING GELATION

Sir:

A study has recently been made in this Laboratory of the electrical conductivity of various mixtures of aqueous solutions of sodium silicate and acetic acid. Measurements were obtained as soon as possible after mixing and were continued until some hours after the gel mixture had set. By this means it was hoped to present evidence in favor of either the fibrillar or the cellular theory for the structure of a silicic acid gel. Any considerable increase in electrical resistance would be considered to be strong evidence for the cellular theory.

In no case was a change of resistance obtained greater than the possible errors of measurement ($< 0.4\%$) from the first reading after mixing until the gel was well set. Four sets of typical data are shown in Table I. Concentrations are expressed in gram moles per liter, the silicate being expressed in its equivalent of sodium hydroxide and silica.

I. Electrical Resistance of Silicic Acid Gel Mixtures

Concentrations, gram moles per liter			Time of set, minutes	Resistance, ohms	Change in resistance
SiO_2	NaOH	CH_3COOH			
1.452	0.876	1.718	35	111	None
0.970	.584	1.140	60	136	None
.485	.292	0.570	300	213	None
.242	.146	.285	1440	450	None

A more complete study of this problem is now under way, using a new type of cell and bridge and a 60-cycle alternating current galvanometer.

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THE TRIMETHYLPENTANES

Sir:

The fact that the dehydration product of methylethyl-*tert*-butylcarbinol on hydrogenation apparently gives a single octane [private communication, P. L. Cramer, General Motors Research Laboratories] seemed to be contrary to our findings that the dehydration gives some rearranged product [This Journal, **54**, 4011 (1932)]. Consequently we have prepared 2,2,3-trimethylpentane (corresponding to the normal dehydration product) and 2,3,3-trimethylpentane (corresponding to the rearranged product).

Their properties are similar and their separation in small amounts would not be possible. Thus there is no discrepancy between our results and those of Cramer.

The pure olefins, 2,2,3-trimethylpentene-3, Cottrell b. p. 111.9° (760 mm.), n_D^{20} 1.4232, d_4^{20} 0.7395, and 2,3,3-trimethylpentene-1, Cottrell b. p. 108.2° (760 mm.), n_D^{20} 1.4178, d_4^{20} 0.7363, obtained by fractionation of the dehydration products of methylethyl-*tert*-butylcarbinol and dimethyl-*tert*-amylcarbinol, respectively, were hydrogenated at room temperature in a Burgess–Parr apparatus using the platinum oxide catalyst of Adams and methyl alcohol as a solvent (150 cc. per 0.25 mole). The products were precipitated by water, shaken with concentrated sulfuric acid to remove water, alcohol and unchanged olefin, and fractionated at a high reflux ratio through a 40 × 0.8 cm. packed column equivalent to 7.7 theoretical plates. The yields of octanes were 92 and 90%, respectively. The remaining isomer, 2,3,4-trimethylpentane, was made similarly from the dehydration products of 2,3,4-trimethylpentanol-3 [THIS JOURNAL, **54**, 4392 (1932)]. The properties of all the possible trimethylpentanes are

	Cottrell b. p. (760 mm.)	n_D^{20}	d_4^{20}
2,2,3-Trimethylpentane	110.2°	1.4030	0.7173
2,2,4-Trimethylpentane	99.3°[a]	1.3916	.6918
2,3,3-Trimethylpentane	113.6°	1.4074	.7258
2,3,4-Trimethylpentane	112.8°[b]	1.4045	.7197

[a] THIS JOURNAL, **51**, 1546 (1929). [b] Corrected from b. p. 111.5° (732 mm.).

The values for the first octane do not agree with those of Clarke and Jones [THIS JOURNAL, **34**, 170 (1912)], who apparently had olefin in their product.

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RAW RAMIE

Sir:

During some x-ray work on ramie fibers a property was noted which might prove of some interest to students of this material.

Untreated ramie (raw ramie) yields an insoluble lead compound when brought in contact with a solution containing lead salt (the chloride, acetate and nitrate were used). This lead compound has a characteristic x-ray powder diagram which is superimposed on the fiber diagram of the pure ramie. The diagram obtained is independent of the anion, so that the reaction product cannot be a double compound, but must be a salt. The original substance (presumably an acid, or salt of such acid) may be leached out with water from the raw fiber. When lead nitrate is added to such a solution a white precipitate settles out gradually. This precipitate