It is generally held that expansion of $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} - \text{H}_2\text{O}$ paste occurs after a rigid structure has been formed⁵. The expanding paste structure must therefore consist of crystals with a size-range from colloidal to macroscopic.

It is known that colloidal crystals have higher solubilities than larger crystals. A thermodynamic theory based on this difference in solubility has been worked out to explain the gross volume expansion of the $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} - \text{H}_2\text{O}$ system, and this will be published elsewhere.

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X-ray Investigation of Potassium Tricyanomethanide ($\text{KC}(\text{CN})_3$)

A CRYSTAL structure investigation of $\text{KC}(\text{CN})_3$ has been carried out and the result of the spectroscopic work by Long, Carrington and Cravenor¹ confirmed.

The potassium salt was prepared according to Cox and Fontaine². The crystals are triclinic and belong to the space group $P1$. The following unit cell dimensions were found:

$$a, 3.87 \text{ \AA}; b, 8.62 \text{ \AA}; c, 8.90 \text{ \AA} \\ \alpha, 75.1^\circ; \beta, 86.7^\circ; \gamma, 90.3^\circ$$

The short a -axis is the needle axis of the crystal. The experimentally determined density is 1.50 g/c.c., and the calculated density assuming the unit to contain two molecules is 1.50 g/c.c. The intensities have been recorded using an integrating Weissenberg camera except for $hk0$ zone where a precession camera was used.

From a Patterson projection along the a -axis the potassium ion positions were easily found and the parameters for all atoms in this projection were determined using Fourier and least squares methods. The R -value of this projection, based on 159 observed reflexions, was brought down to 7 per cent. A Fourier map of this projection is shown in Fig. 1. The potassium cations are surrounded by nitrogen atoms of the $\text{C}\equiv\text{N}$ groups at a mean distance of 2.90 Å. The projection along the c -axis was refined using Fourier methods and is at the present stage of refinement 16 per cent based on 61 observed $hk0$ -reflexions.

A least-squares refinement has so far not been carried out in this projection.

Fig. 1

The following mean values can be reported at the present stage:

$\text{C}-\text{C}$: 1.40 Å; $\text{C}\equiv\text{N}$: 1.15 Å; $\angle \text{C}-\text{C}-\text{C}$: 120° with values ranging from 118° to 122° and $\angle \text{N}-\text{C}-\text{N}$: 120° with the same deviations. The angle $\text{C}-\text{C}-\text{N}$ is 175° with deviation up to 3° . The sum of the three central angles is 360° whether the $\text{C}-\text{C}-\text{C}$ or $\text{N}\cdots\text{C}\cdots\text{N}$ angles are measured.

Assuming an sp^2-sp hybridization on the central- and cyano-carbons the $\text{C}-\text{C}$ distance is about what could be expected, as is the $\text{C}\equiv\text{N}$ distance. Even if nothing can be said about the accuracy of the angles at this stage there does not seem to be any indication of the molecule not being planar. We think that a three-dimensional investigation will be necessary to discover whether or not the deviation of the $\text{C}-\text{C}\equiv\text{N}$ angle is significant. It should be pointed out that the planarity of the anion is in agreement with the structure of the ammonium salt of tris(methylsulphonyl)methane³.

A three-dimensional investigation is in progress and the results of this will be published later.

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CHEMISTRY

Inhibition of the Photoreduction of Flavin Mononucleotide

It has recently been suggested that 3-(p -chlorophenyl)-1,1-dimethylurea (CMU) changes specifically the reactivity of excited flavin molecules but has no effect on the photoreduction of other dyes such as phthalocyanine dyes or methylene blue¹. It was argued that the formation of a CMU flavin complex may be responsible for this effect, particularly since CMU and flavin have 'similar structures'^{1,2}, thus introducing specificity into the CMU flavin interaction.

In the course of our own work on the anaerobic photoreduction of flavin mononucleotide (FMN) by its own side-chain (henceforward referred to as photobleaching) or by NADH, we had occasion to examine the effect of a variety of substances on the photoreduction rates. The selection of these substances was guided by the following principles: (1) Since FMN is probably bound to proteins in photosynthetic systems, it was of interest to investigate initially the effect of several amino-acids on the photoreduction. (2) It has been suggested that the binding of the coenzyme to the protein in flavoproteins may be through a charge-transfer complex⁴. It is also well known that FMN forms charge-transfer complexes with a number of donors in solution^{4,5}. The influence of some of these types of substances on the photoreduction was therefore investigated. (3) Finally the effect of some herbicides and other inhibitors of photosynthesis was also examined.

The rates of the photobleaching of FMN and the reduction by NADH were followed spectroscopically in deoxygenated aqueous solutions at $\text{pH}=7$ (phosphate buffer)³. The solutions were 0.3×10^{-4} to 0.4×10^{-4} M in FMN and 0.5×10^{-3} M in NADH. The effect of the added substances on the rates of the two reactions is summarized in Table 1, and is expressed as percentage inhibition of the initial rates of the reactions without the added substances. The per cent inhibition of the photoreductions by the adenine moiety in FAD as compared with FMN are also included in Table 1.

When serotonin is added to a solution of FMN reduced photochemically prior to the addition of the inhibitor,