alcoholic solution of the ketone (*i. e.*, in acid solution), it is possible that the two materials are stereoisomers. This point will be examined.

Our efforts to prepare fluorenones substituted in positions ortho to the carbonyl group are being continued.

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RECEIVED DECEMBER 28, 1931
PUBLISHED FEBRUARY 5, 1932

REACTION OF PHENYLACETONITRILE

Sir:

While investigating the action of sodium on benzyl cyanide, it was found that one mole of phenylacetonitrile dissolved in liquid ammonia reacts almost quantitatively with one mole of sodium to form a salt, presumably sodium phenylacetonitrile, which remains suspended in liquid ammonia. This when treated with ethyl bromide in liquid ammonia yields phenylethylacetonitrile.

In previous work Rossolymo used sodium hydroxide, Hintikka, sodamide in toluene, Bodroux and Taboury, sodamide in ether, Rising, sodium in ether, Rising and Zee, sodamide in ether, as a means of forming sodium phenylacetonitrile.

It is interesting to note that presumably only one of the hydrogen atoms on the carbon atom, alpha to the cyanide group, can be replaced at one time by sodium in liquid ammonia. If, after treatment with ethyl bromide to form phenylethylacetonitrile, this latter nitrile is treated with sodium in liquid ammonia, a mole of sodium can be introduced per mole of nitrile.

This procedure can be utilized in the preparation of mono and dialkylated alkyl or aryl cyanides. It is being investigated further in these laboratories.

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RECEIVED DECEMBER 28, 1931
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THE CRYSTALLINITY OF OPALS AND THE EXISTENCE OF HIGH-TEMPERATURE CRISTOBALITE AT ROOM TEMPERATURE

Sir:

Opals have thus far been considered as outstanding examples of truly amorphous solids. The introduction of x-ray methods did not alter this result materially since Lehmann [W. M. Lehmann, *Z. Krist.*, **59**, 455 (1923)] reported that gem opal and ordinary opal give the Debye–Scherrer–Hull diagram of an amorphous solid; however, fire opal gives a faint in-

dication of crystallinity. Later Rinne [F Rinne, *Z. Krist.*, **60,** 55 (1924)] studied several samples of opals by means of x-rays and found them to be amorphous.

The results obtained in this Laboratory are quite different from these previous findings. Thus far fifteen samples of various types of opal have been investigated, all of which show definite crystallinity which is very pronounced in the majority of the cases. Also most of the samples give an identical pattern.

This pattern is of unusual interest since it does not correspond to either low-quartz, low-tridymite or low-cristobalite, which are the only modifications of silica ever definitely established to exist at room temperature. The pattern, is however, in perfect agreement with the one of high-temperature cristobalite as reported by Wyckoff [R. W. G. Wyckoff, *Am. J. Sci.*, **9,** 448 (1925)., *Z. Krist.*, **62,** 189 (1925)].

Comparison with a picture of the cubic high-temperature form prepared in this Laboratory confirms this identity. The unlikely possibility of a hydrate of similar structure is excluded by the fact that the diagram remains unchanged after heating of the sample for one hour at 1100°.

Two reports have been made suggesting that high temperature cristobalite might persist at room temperature for some time, but according to Sosman [R. B. Sosman, "The Properties of Silica," The Chemical Catalog Co., Inc., New York, 1927, p. 133] these claims, based on optical examination, are of doubtful validity; 200° is the lowest temperature at which high-cristobalite has been observed to exist according to reliable experiments (compare Sosman).

However, we have now provided definite proof of the existence of high-temperature cristobalite at room temperature for an indefinite period of time.

These investigations are being continued and a complete report will appear soon.

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RECEIVED JANUARY 2, 1932
PUBLISHED FEBRUARY 5, 1932

THE STARCH-IODIDE REACTION

Sir:

Remington, McClendon and von Kolnitz have recently reported [THIS JOURNAL, **53,** 1245 (1931)] that they could not confirm Turner's observations as to the reliability and stability of the color produced by the starch–iodide reaction. They state that if the blue solution is read against a blue glass instead of a starch–iodine solution, it will be found that the color is quite sensitive to temperature changes and varies with the time. These