

LETTERS TO THE EDITOR

Dear Editor,

The principal chemical methods of determination of isoparaffins in paraffins of normal structure (reaction with antimony pentachloride, chlorosulfonic acid, ethyl chlorosulfonate, nitric acid, etc.) employed up to now are hardly suitable for work with hydrocarbon mixtures. Physical methods (infrared spectra, etc.) have hitherto been hardly suitable for routine operations.

We put forward a new color reaction for qualitative tests. It is based upon the partial chlorination of an isoparaffin at normal temperature with an aqueous solution of ferric chloride in which the trivalent iron is reduced to divalent iron and the latter is detected by reaction with potassium ferricyanide. The resultant Turnbull blue gives a greenish-blue ring at the interface between the hydrocarbon and the aqueous solution. The reaction is very sensitive and enables 1-2% of isoparaffin to be detected in a mixture of paraffins. The isoparaffin is chlorinated to the extent of 0.5% and therefore the reaction cannot be employed under the specified conditions for development of a quantitative method of determination of isoparaffins.

The reaction was checked with a series of pure paraffinic hydrocarbons of normal structure; their mixtures with isoparaffins, and paraffinic hydrocarbons separated from petroleum. It gave positive results only when paraffins containing a tertiary carbon atom were present in the mixture.

Naphthenic hydrocarbons with a tertiary carbon atom (e. g., methylcyclohexane) give the characteristic ring of Turnbull blue. Octadecylcyclohexane does not react with ferric chloride under similar conditions and a weak ring is developed only after 24 hrs. This behavior of octadecylcyclohexane is probable due to the influence of the chain length upon the activity of the tertiary carbon in the naphthene ring. The reaction should be carried out in the absence of aromatic and unsaturated compounds.

Cyclohexane, cyclopentane and hydrocarbons with a quaternary carbon atom do not give this reaction.

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ERRATA

In A. A. Balandin's letter to the editor in No. 7 of 1957, the first formula from the bottom on page 882 should read as follows:

$$K + \sum_{r=2}^{r=n} [(A_{nr} + A_{nr}) \ln (1 - m_n/A_{nr}) + m_n] z_r = m_n$$