

bon atoms are higher than those containing an odd number. Aromatic position isomers can be distinguished readily with the exception of the *o*-toluate and the *m*-toluate. Mixed melting points of salts with identical or nearly identical melting temperatures are from six to twelve degrees lower than those of the pure compounds.

I. ALIPHATIC SALTS

| | M. p., cor., °C. | | M. p., cor., °C. |
|----------------|------------------------|-------------------|------------------------|
| Acetate | 149 | Monochloroacetate | 154 |
| Butyrate | 142 | Oleate | 133 |
| Caprate | 145 | Oxalate | 194 |
| Caproate | 146 | Palmitate | 135 |
| Caprylate | 147 | Propionate | 146 |
| Diethylacetate | 141 | Stearate | 135 |
| Formate | 148 | Succinate | 167 |
| Glutarate | 149 | Trichloroacetate | 146 |
| Heptylate | 147 | Valerate | 146 |
| Laurate | 142 | Isovalerate | 148 |
| Malonate | 139 | | |

II. AROMATIC SALTS

| | | | |
|--------------------------|-----|------------------------|-----|
| Benzoate | 154 | <i>o</i> -Iodobenzoate | 154 |
| <i>o</i> -Bromobenzoate | 163 | <i>m</i> -Iodobenzoate | 152 |
| <i>m</i> -Bromobenzoate | 154 | <i>p</i> -Iodobenzoate | 181 |
| <i>p</i> -Bromobenzoate | 173 | Phthalate | 166 |
| Cinnamate | 170 | Salicylate | 168 |
| <i>o</i> -Chlorobenzoate | 168 | <i>o</i> -Toluate | 151 |
| <i>m</i> -Chlorobenzoate | 150 | <i>m</i> -Toluate | 151 |
| <i>p</i> -Chlorobenzoate | 163 | <i>p</i> -Toluate | 165 |

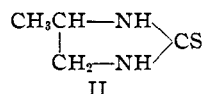
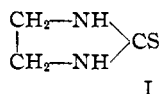
DEPARTMENT OF CHEMISTRY
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RECEIVED AUGUST 14, 1941

A Qualitative Test for Ethylene and Propylene Thioureas

BY C. O. EDENS AND TREAT B. JOHNSON

The 2-thio-4,5-dihydroglyoxalines have not received the attention that they deserve. It is possible that some of the simple representatives of this series may prove to be substances of biochemical interest, and it is desirable to acquire a better knowledge of their chemistry. During the course of some investigations in this series, the authors have found very useful a spot-test for detecting small amounts of the two simple reduced 2-thioglyoxaline derivatives I and II in reaction products.



The procedure is very simple and consists of adding a few drops of the unknown to 1 ml. of the

spot reagent.¹ A positive test is indicated by the immediate formation of a characteristic colorless and gelatinous precipitate composed of extremely small fiber-like crystals. These fibers are visible by a high-powered microscope.

| 20 drops of reagent + 1 ml. of ethylene-thiourea which is | Result |
|---|---|
| 0.01 <i>M</i> | Precipitate at once |
| .005 | Slight precipitation |
| .0025 | Precipitate after one minute |
| .0010 | After cooling to 5° for four minutes became slightly opalescent |

The lowest dilution giving a precipitate is 0.001 *M*. One ml. of this solution gives a distinct opalescence. Thus the sensitivity of the tests permits detection of 0.102 mg. per ml. of ethylene-thiourea in pure aqueous solution.

The test may be used as a semi-quantitative method by diluting a known volume of liquid until precipitation is no longer observed. The free thiol group appears to be necessary for the formation of the characteristic precipitate. Interaction of the thiodihydroglyoxaline with chloroacetic acid prevents the formation of a precipitate with the spot-reagent. The test has proved very convenient in our work, and has given reliable results. Much is yet to be learned, however, about interfering substances. The test was also applied to 2-thio-5-methylglyoxaline, and with formation of a gelatinous precipitate. It is very possible that this reagent may serve not only for detection, but also for developing a technique for the isolation of these sulfur cycles from mixtures of biological products.

(1) The reagent is a mixture of equal volumes of saturated aqueous copper sulfate and concentrated hydrochloric acid.

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RECEIVED SEPTEMBER 23, 1941

The Use of Amalgamated Aluminum as a Catalyst in the Friedel and Crafts Reaction

BY L. I. DIUGUID

It has been shown by the writer¹ that a series of alkylbenzenes could be prepared via Friedel and Crafts procedure using amalgamated aluminum catalyst. Isolated examples of the use of amalgamated aluminum or aluminum have been reported but no systematic investigation under

(1) Research work completed under the supervision of Dr. W. T. Miller, Cornell University, in partial fulfillment of the requirements for the degree of Master of Science (Thesis, 1939).