

# UNITED STATES PATENT OFFICE

2,656,376

## METHOD OF STABILIZING ACRYLONITRILE

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No Drawing. Application September 23, 1950, Serial No. 186,506

5 Claims. (Cl. 260—465.9)

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The present invention relates to the stabilization of acrylonitrile, and more particularly to a method of inhibiting the formation of undesirable color in acrylonitrile during periods of storage and shipment and to the thus color stabilized acrylonitrile.

Freshly distilled acrylonitrile is a water-white mobile liquid. During periods of storage and shipment it frequently develops a yellow color which lessens its value as a commodity in the manufacture of a variety of useful products, particularly in the production of synthetic fibers. Different batches of acrylonitrile have been found to develop color at different rates.

I have now discovered that by incorporating in acrylonitrile a small quantity of a chloride of the group consisting of aluminum chloride, ammonium chloride, cadmium chloride, mercuric chloride and zinc chloride, for example one part of chloride per 50,000 parts of the nitrile, the development of undesirable color is retarded.

The new stabilization agents are non-reactive with acrylonitrile and soluble therein to the desired extent. The quantity of chloride employed is usually of the order of one part of chloride to from 10,000 to 100,000 parts of acrylonitrile.

The stabilizing effect of the chlorides in acrylonitrile has been investigated by a color standard method according to the following procedure.

Samples of freshly distilled acrylonitrile and the same containing different amounts of chloride were stored in glass containers in diffuse daylight at room temperature and examined for color at different intervals by means of a spectrophotometer.

The color readings of the acrylonitrile samples were obtained by comparison with readings made on a series of platinum-cobalt standard solutions utilized in the sanitary examination of water and approved by the American Public Health Association (Standard Methods for the Examination of Water and Sewage, 8th ed., 1936).

In recording the color readings a number not greater than 20 is considered water-white, 50 is very pale yellow, 100 is pale yellow, and 200 is yellow.

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Table 1

Parts of mercuric chloride per million parts of acrylonitrile	Original Color reading	Color reading after 3 months' storage
0.0.....	10	110
2.0.....	10	63
3.0.....	10	57
5.0.....	10	41
7.5.....	10	38
10.0.....	10	14
25.0.....	10	7

Table 2

Parts of stabilization agent per million parts of acrylonitrile	Original Color reading	Color reading after storage for—	
		2 months	7.5 months
57 parts of AlCl <sub>3</sub> .....	5	65	133
64 parts of NH <sub>4</sub> Cl.....	5	6	8
55 parts of CdCl <sub>2</sub> .....	5	6	9
61 parts of HgCl <sub>2</sub> .....	5	6	13
60 parts of ZnCl <sub>2</sub> .....	5	9	23
	5	11	26

Table 3

25 parts of HgCl <sub>2</sub> per million parts of acrylonitrile	Original Color reading	Color Reading after storage for 8 months and 10 days
Sample #1 untreated.....	20	75
Sample #1 treated.....	20	20
Sample #2 untreated.....	20	140
Sample #2 treated.....	20	20
Sample #3 untreated.....	20	170
Sample #3 treated.....	20	25
Sample #4 untreated.....	20	560
Sample #4 treated.....	20	25
Sample #5 untreated.....	20	560
Sample #5 treated.....	20	20

Acrylonitrile containing 25 parts of mercuric chloride per million parts of acrylonitrile had a color reading of 60 after storage for six months in a five gallon steel drum. Untreated acrylonitrile of the same batch after storage for the same

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period in a steel drum had a color reading of 600. The color reading before storage of both the treated and untreated acrylonitrile was 20.

Acrylonitrile stabilized according to the present invention can be stored for extended periods without any substantial formation of color.

While the invention has been described with particular reference to specific embodiments, it is to be understood that it is not to be limited thereto but is to be construed broadly and restricted solely by the scope of the appended claims.

I claim:

1. A color stable acrylonitrile containing a chloride of the group consisting of aluminum chloride, ammonium chloride, cadmium chloride, mercuric chloride and zinc chloride.
2. A color stable acrylonitrile containing ammonium chloride.
3. A method of producing a color stable acrylonitrile which includes the step of dissolving in

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acrylonitrile a color-stabilizing amount of a chloride of the group consisting of aluminum, chloride, ammonium chloride, cadmium chloride, mercuric chloride and zinc chloride.

4. The method of claim 3 in which the chloride is employed in the proportion of one part of chloride to from 10,000 to 100,000 parts of acrylonitrile.

5. A method of producing a color stable acrylonitrile which includes the step of dissolving in acrylonitrile a color-stabilizing amount of ammonium chloride.

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