Standard Oil Company (Indiana)

INFORMATION DIVISION TRANSLATION T47-26

API-TCM Reel 48, Frames 740-741

Preparation of the cobalt-thorium catalyst

(Cobalt-Normal catalyst: 100 Co: 15 ThO_2: 200 Kg.)
Laboratory charge with 25 g cobalt.

1) Starting Materials:

a) 124 g cobalt-nitrate ($Co(NO_3)_2\ 6\ H_2O$), corresponding to 25 g Co-metal
b) 7.85 g thorium nitrate ($Th(NO_3)_4\ 4H_2O$), corresponding to 3.75 g thorium oxide (15%/Co).
c) 59 g H_2O-free soda.
d) 50 g kieselguhr (200 %/Co)
e) 3 liters distilled water heated to boiling

2) Precipitation

a) Cobalt-nitrate and thorium-nitrate together are dissolved in water, diluted to 500 cc, and heated to boiling. 59 g of soda are dissolved in 750 cc of distilled water and heated to boiling in the precipitation vessel of V2 a-steel. The flame is removed and the precipitation is carried out by quickly pouring the cobalt-thorium solution into the soda solution, stirring constantly. Immediately after the precipitation, 50 g of kieselguhr are mixed in. The total precipitation time should be less than 1 minute.

b) In place of the solid salts of cobalt nitrate and thorium nitrate, one can also use solutions of cobalt nitrate and thorium nitrate, i.e. those which can be obtained by dissolving cobalt metal and thorium hydrocarbonate in nitric acid, or by other means. Since the cobalt-thorium solutions usually contain varying amounts of free nitric acid, one needs a large amount of soda for the precipitation, as indicated above.

One then proceeds as follows:
5 cc of the cobalt-thorium solution diluted to 500 cc are titrated with a diluted soda solution which contains 100 g soda in 1 liter:

i) to the beginning of a constant cloudiness. The amount $\frac{\text{cc soda solution}}{10}$ is then the g of soda which have to be added to 59 g of soda in order to obtain complete precipitation.

ii) to the complete precipitation, i.e. until the solution above the precipitate is colorless and clear. The cc soda solution used then indicates how much soda is necessary for the complete precipitation.

3) Filtration

After the precipitation the mother liquor is filtered by suction.

as quickly as possible, through a funnel (diameter 190 mm) using S.+S. filter paper II 589³, so that there are no cracks in the filter-cake. (The time from the beginning of the precipitation to the removal of the mother liquor should not be more than 2 minutes.) Then one washes 6 times with 500 cc of hot distilled water each, always being careful not to let any cracks appear in the filter-cake. Finally the funnel is sucked as dry as possible and the cake is pressed down with the help of a spatula.

4) Drying and Breaking Up

The catalyst is placed in a dish, separated into small pieces, and dried evenly in the drying oven at 110-120°. This requires up to 12 hours. The dry catalyst is weighed and is then broken up on a sieve. The particles between 1-3 mm are sifted.

From the weight of the dry catalyst one can calculate the cobalt content. However, it is advisable to have the composition of the catalyst tested analytically from time to time.

/S/ Roelen

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