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PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Process for the Production of Catalysts

We, RUHRCHEMIE AKTIENGESELLSCHAFT, of Oberhausen-Holten, Germany, a Company organised and existing according to the Laws of the German State, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Catalysts that contain magnesium in addition to cobalt and that have, if necessary, been activated by thorium or other additions have proved particularly effective for the synthesis of benzine hydrocarbons from hydrogen and oxides of carbon. Such catalysts last a long time and can be used over a long period without loss in efficiency, without the necessity for regeneration or for raising the temperature.

If, in producing catalysts of cobalt and magnesium, for example, solutions of the nitrates or chlorides of the two metals that contain the metals in the same proportion as the catalyst to be produced are precipitated with alkali carbonates, quite a lengthy period is required for precipitating all the magnesium. If the precipitated cobalt remains for some time in the precipitating solution, there arise ageing phenomena which prejudicially affect the surface formation of this main constituent of the catalyst to be produced. If, however, in order to avoid this disadvantage the time taken for precipitation is reduced, the precipitated catalyst will not contain the quantity of magnesium needed for developing the full activity of the cobalt.

It has been found according to the invention that very effective catalysts of cobalt and magnesium are produced if, when using solutions of the nitrates or chlorides of cobalt and magnesium, a magnesium solution is used whose content of magnesium is greater than corresponds to the stoichiometric proportion of magnesium to cobalt in the catalyst to be produced. By the method of the invention a catalyst can be precipitated from a common solution of the chlorides or nitrates of cobalt and magnesium, which solution conforms to the requirements referred to, in such a short time that there is no injurious change in the cobalt carbonate precipitated. The process according to the invention can also be carried out in such manner that magnesium first is precipitated by itself from a solution that contains a larger quantity of magnesium than corresponds to the stoichiometric proportion of magnesium and cobalt in the catalyst to be produced. The quantity of magnesium is so determined that a period of from 1 to 3 minutes is required for precipitation from a boiling solution. Thereupon the quantity of cobalt required for the catalyst is precipitated in the same solution upon the magnesium already precipitated. The precipitate is filtered directly after separation and after the addition of the carrier substance.

By adjusting the amount of excess magnesium it is possible to control exactly the effectiveness of the catalyst to be produced. For example an excess of from 25 to 75% of magnesium may be used in the precipitating solution; but an excess of as low as 10% is sufficient. Whether the magnesium and cobalt are being precipitated together or whether they are being precipitated in succession, by ensuring that the cobalt precipitate always remains in the solution for as short a time as possible, highly efficient catalysts of cobalt and magnesium are obtained.

The process according to the invention is illustrated by the following Examples.

EXAMPLE 1.

A solution containing 24.91 gm. cobalt (Co) in the form of its nitrate and 3.97 gm. MgO also in the form of its nitrate, that is to say, 16 parts of MgO to 100 parts of Co, was precipitated at boiling temperature with an approximately 10% solution of sodium carbonate during a total period of 1-2 minutes. The necessary quantity of carrier material was then added and the whole immediately filtered. A precipitate was obtained that contains in addition to all the Co. 2.42 gm. MgO, that is to say, 9.75 parts of MgO to 100 parts of Co.

EXAMPLE 2.

From 2 litres of a solution of magnesium nitrate that contained altogether 150 gm. MgO the major part of the magnesium was precipitated in the form of

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the carbonate by adding the magnesium nitrate solution to 30 litres of an approximately 10% boiling solution of soda in the course of about 1-2 minutes. After this period 10 litres of a solution of cobalt nitrate that contained altogether 1 kg. of cobalt were added to the solution which was maintained in a boiling state, in the course of about 1-2 minutes. The necessary carrier material was then added and the whole immediately thereafter filtered hot. The precipitate contained to every 100 parts of cobalt 11.9 parts of magnesium oxide. Thus of the quantity of MgO obtained in the magnesium nitrate solution used, about 80% passed over into the precipitate obtained.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A process for producing catalysts of cobalt and magnesium for use in the catalytic conversion of mixtures of carbon monoxide and hydrogen by precipitation simultaneously or successively of the magnesium and cobalt contained in a solution of their nitrates or chlorides, in which a magnesium solution having a larger content of magnesium than corresponds to the stoichiometric ratio of magnesium to cobalt in the catalyst to be produced is used.

2. A process for producing catalysts of cobalt and magnesium substantially as hereinbefore described.

Dated this 8th day of September, 1938.
W. P. THOMPSON & CO.,
Agents for the Applicants.

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