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WORKING UP OF CHROMIUM ORES

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The invention relates to a preliminary treatment of chromium ores prior to the working up thereof.

I have found that chromium ore, which is only difficultly attacked by chemical agents, is converted into a condition in which it is considerably more readily amenable to chemical attack by heating it in an oxidizing atmosphere to a temperature exceeding 800° C. The ore thus treated can then be easily transformed by means of the known decomposition processes into chromium salts or chromates.

In conformity therewith I have found further that a chromium ore, which has been subjected to the said preliminary oxidizing treatment, when submitted to the known process of an oxidizing working up by means of alkali carbonate in the presence of lime, dolomite or bauxite yields already at essentially lower temperatures the same degree of decomposition as a non-pretreated ore at a higher temperature. In a similar manner chrome-iron ore after being treated, as already indicated, is converted more readily by acid decomposition into chromium salts.

The preliminary treatment is carried out in the simplest manner by igniting the ore for a short time in air, whereby the temperature minimum of 800° C. should not be lost sight of. The effect of the preliminary treatment is assisted to a large extent, when the ore is heated in the presence of small amounts, say, 2 to 3 percent of oxygen-yielding substances, such as for example, sodium or potassium nitrate.

For example, when subjecting a mixture of 7 parts of untreated chromium ore of 44% Cr_2O_3 content, 6 parts of lime and 5 parts of sodium carbonate to oxidation at 850° C., it will be found that after about an hour 75–78% of the ore is oxidized. However, when a mixture of the same composition, after having been previously calcined for about 30 minutes at about 1000° C. in the air, is likewise oxidized at 850° C. 93–95% of the ore is converted into sodium chromate during the same time.

By employing higher decomposition temperature such as for example, 900°–1100° C. chromium ore, which has not undergone the preliminary treatment is decomposed and oxidized in one hour, while ore, treated as fully described in the preceding paragraph gives a similar degree of decomposition and oxidation already after 30 to 40 minutes.

The improved process is likewise applicable to other decomposition processes than the lime soda process and involves an essential improvement in the degree of decomposition and oxidation. For example, from a mixture consisting of 25 parts of chromium ore (44% Cr_2O_3 content), 25 parts of bauxite (60% Al content) and 50 parts of sodium carbonate, 56% of the ore contained therein is oxidized at 800° C. in the course of 50 minutes, while, after first igniting the ore for half an hour in the air at 1000° C., the degree of oxidation amounts to 71%.

I claim:

1. Process which comprises heating chromium ore in an oxidizing atmosphere to a temperature exceeding 800° C. in the presence of a small quantity of a solid oxidizing material prior to subjecting it to decomposition in accordance with the known processes.

2. Process which comprises heating chromium ore in an oxidizing atmosphere to a temperature exceeding 800° C. in the presence of 2 percent of sodium nitrate prior to subjecting it to decomposition in accordance with the known processes.

In testimony whereof I have hereunto set my hand.

ERNST HACKHOFER.