

STUDY OF NICKEL BRIQUETTES BY THERMOGRAPHIC METHOD

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The results of thermogravimetric studies of nickel concentrate (briquettes) with the establishment of its characteristic features are presented. The study of nickel concentrate with different reducing agents showed the thermographic possibility of involving them in metallurgical processing. The values of the activation energy in the process of thermal studies are determined.

Key words: Nickel briquette, agglomeration, smelting, physico-chemical transformations, activation energy.

INTRODUCTION

As at know, the oxidized nickel ore in the bulk consists of a fine fraction and therefore can not be used in the mine furnace and electric smelting. One of the types of preparation of nickel ores for smelting is pelletizing. In metallurgical practice, there are many different methods of pelletizing fine materials, but the most common are three methods: briquetting, agglomeration and pellet production. Each method has its own requirements for the preparation of the material, while affecting the physico-chemical conditions of the pelletizing process and the quality characteristics of the final product [1-5].

RESEARCH METHODOLOGY

Briquetting is the process of thermochemical processing of small and weakly structured ores, concentrates and production waste in order to obtain briquettes from them-pieces of geometrically correct uniform shape and constant dimensions. According to modern technology, briquetting can be carried out with the use of binding materials and without them [6-8].

RESULTS RESEARCH AND DISCUSSION

In order to define the possibility of settling nickel ore of the 0 - 3 mm fraction, briquetting studies were carried out on a laboratory press unit with a maximum permissible pressure of 250 kgf / cm². To study the pressing process, nickel ore with a chemical composition % (Ni_{general} - 1,23; Fe_{general} - 14,38; Cr_{general} - 1,69; SiO₂ - 51,57; MgO - 3,52; Al₂O₃ - 1,87), mixed with

long - flame coal, with a technical composition (C - 49,99; V^c - 35; A^c - 9,85; W - 4,8) was used [8].

Liquid glass was used as a binding material for briquetting. The consumption of the binder material (liquid glass), depending on the silicate module, varied in the range of 8 - 10 % by weight. As a result, nickel ore briquettes with a diameter of 15 - 20 mm and a height of 15 - 25 mm were obtained (Figure 1) with a compressive strength of 50 - 60 kg / briquette. The technological characteristics of the manufactured briquettes are summarized in Table 1.

Table 1 **Technological parameters and quality of briquettes obtained from nickel ore**

Parameters and indicators	Units of measurement	Indicators
1. Raw briquettes: - crush resistance - solid binder consumption	/ kilo / briquette / %	10 - 20 8 - 10
2. Drying of briquettes: - temperature - drying time	/ °C / hour	250 - 300 1 - 2
3. Ready-made briquettes: - crush resistance - impact strength - abrasion resistance - diameter of briquettes	/ kilo / briquette / % / % / mile	50 - 60 60,0 25 - 30 1,5 - 2,0

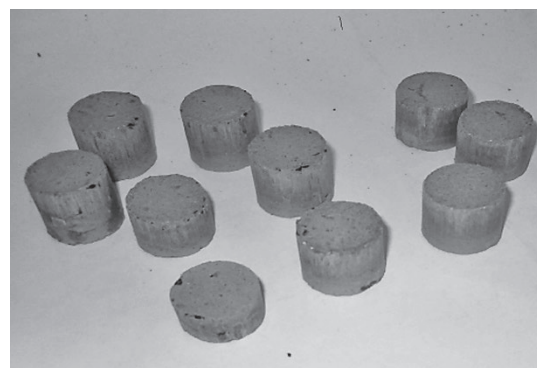


Figure 1 Briquettes obtained from nickel ore

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