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# Preparation and formation mechanism of monodisperse micaceous iron oxide from iron chromium grinding waste

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## Abstract

The aim of this study is to develop a new method for the preparation of high-value, environmentally friendly products from iron chromium grinding waste (ICGW). Using iron-chromium hydroxide precursors from the wet treatment of ICGW as raw material, monodisperse micaceous iron oxide (MIO) has been prepared via hydrothermal method. The effect of NaOH concentration and hydrothermal reaction temperature on the formation and morphology of obtained MIO powders were investigated carefully. Synthesized MIO powders have high purity (97.6%), even distribution of sizes (~15 $\mu$ m) and uniform flake. Quality test results showed that MIO products met the first rank criterion of ISO 10601-2007 (the standards of MIO pigments for paints). Furthermore, the formation mechanism of MIO from iron-chromium hydroxide precursors was discussed.

**Keywords:** Micaceous iron oxide; iron chromium grinding waste; hydrothermal process; formation mechanism; recycling

## 1. Introduction

Iron oxide is an important inorganic nonmetallic material, which is widely used in pigments [1-2], catalyzer [3-4], biomedical engineering [5] and other fields [6]. Micaceous

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