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# STRUCTURAL EVOLUTION OF HEAT-TREATED COLLOIDAL PYRITE UNDER INERT ATMOSPHERE AND ITS APPLICATION FOR THE REMOVAL OF Cu(II) ION FROM WASTEWATER

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## Abstract

In this paper, we report a study on structural evolution, magnetic susceptibility and arsenic content of colloidal pyrite from Xinqiao deposits in Tongling, Anhui Province, China. The pyrite was treated under $N_2$ atmosphere and charaterized with X-ray powder diffraction (XRD), field emission scanning electron microscopy (FE-SEM), magnetic susceptibility analysis, and atomic fluorescence spectroscopy (AFS). We observed that heating of colloidal pyrite in $N_2$ atomosphere did not change the crystal structure, arsenic content and magnetic susceptibility at lower temperatures (<350 °C). A small amount of magnetite and monoclinicpyrrhotite were formed at 400°C. Monoclinic pyrrhotite was the major product at 500°C. Hexagonal pyrrhotite appeared and magnetite transformed to pyrrhotite at 600°C. Hexagonal pyrrhotite further transformed to troilite (FeS). At 900°C, troilite (FeS) was the only final product. The magnetic susceptibility shows a sharp increase by increasing the temperature from 400°C to 450°C due to formation of magnetite and monoclinic pyrrhotite. We also compared the removal of Cu(II) ion from wastewater with colloidal pyrite and its heat-treated products. Removal of Cu(II) ion was most efficient with the products heat-treated at 500°C.

*Key words:* colloidal pyrite, Cu (II) ion, heat-treated, purification, structural evolution

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