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Pyrite magnetic strengthen and magnetic separation desulfurization of fine coal based on microwave energy

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The throughput of pyrite extraction from coal using the conventional magnetic separation method can be effectively improved by increasing the magnetic susceptibility of pyrite. The electromagnetic characteristics and absorption response of fine high-sulfur coal were studied to evaluate the strengthening effect of microwave treatment on the magnetic susceptibility of pyrite. In actual production, the microwave treated pyrite was affected by oxygen and water vapor in the air, so it is necessary to consider the effects of various factors on the magnetic enhancement after microwave pretreatment. Magnetism of fine coal stored under room temperature in air for long-term will become weaker, due to the formation of pyrrhotite. Also, the pyrite is not stable in air during the microwave pretreatment process. Due to the porosity of fine coal, when it is placed in air, oxidation reaction occurs between a small amount of oxygen and coal pyrite. This is the reason for the decrease in the specific magnetic susceptibility and the weakening of the magnetic behavior of fine coal. Analysis of different sputtering times indicates the different depths from the surface. During the microwave treatment, pyrite Fe₂ (SO₄)₃ and ferrous sulfate FeSO₄ are mainly present on the surface of pyrite, and surface oxidation takes place. The relative content of Fe₂ (SO₄)₃ in the treated coal is higher than that of FeSO₄.

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