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## 铁尾矿制备BaO-Fe<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>微晶玻璃的晶化过程

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**摘要:**以鞍山铁尾矿为主要原料制备BaO-Fe<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>系微晶玻璃, 并利用DSC、XRD、SEM以及FT-IR对微晶玻璃的晶化过程和微观结构进行研究。结果表明: DSC曲线上出现的放热峰所对应的温度800 °C和870 °C分别为BaSi<sub>2</sub>O<sub>5</sub>相与BaFe<sub>12</sub>O<sub>19</sub>相的析晶温度; 微晶玻璃晶化过程中的初晶相为BaSi<sub>2</sub>O<sub>5</sub>, 中间过渡相为Ba<sub>2</sub>FeSi<sub>2</sub>O<sub>7</sub>, 并随着温度的升高而消失, 最终形成主晶相BaFe<sub>12</sub>O<sub>19</sub>, 次晶相为BaSi<sub>2</sub>O<sub>5</sub>的微晶玻璃; 随着晶化温度的升高, 微晶玻璃的红外吸收带在800~700 cm<sup>-1</sup>波长范围发生宽化, 在1 100~900 cm<sup>-1</sup>和500~400 cm<sup>-1</sup>波长范围内发生分裂; 玻璃结构中的[FeO<sub>4</sub>]向[FeO<sub>6</sub>]转化促进玻璃的析晶, 出现BaFe<sub>12</sub>O<sub>19</sub>的红外特征吸收峰。

**关键字:** 铁尾矿; 微晶玻璃; BaFe<sub>12</sub>O<sub>19</sub>; 晶化过程

## Crystallization on BaO-Fe<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> glass-ceramic made from iron ore tailing

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**Abstract:** BaO-Fe<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> system glass-ceramic was synthesized from iron ore tailing of Anshan as starting material. The crystallization process and microstructure of the glass-ceramic were investigated using differential scanning calorimetry (DSC), X-ray powder diffraction (XRD), scanning electron microscopy (SEM) and fourier transform infrared spectroscopy (FT-IR). The DSC results show that exopeak temperatures at 800 and 870 °C correspond to the crystalline phase formation of BaSi<sub>2</sub>O<sub>5</sub> and BaFe<sub>12</sub>O<sub>19</sub>, respectively. The initial crystalline phases of the sample are BaSi<sub>2</sub>O<sub>5</sub> and Ba<sub>2</sub>FeSi<sub>2</sub>O<sub>7</sub> as transition crystalline phase changed into BaFe<sub>12</sub>O<sub>19</sub> with increase of temperature. The final crystalline phases of the glass-ceramic are BaFe<sub>12</sub>O<sub>19</sub> and BaSi<sub>2</sub>O<sub>5</sub>. With the increase of crystallization temperature, infrared absorption bands of the sample are broaden within the range of 800~700 cm<sup>-1</sup> and are splitted within the range of 1 100~900 cm<sup>-1</sup> and 500~400 cm<sup>-1</sup>. The crystallization is accelerated by [FeO<sub>4</sub>] fundamental unit shifted to [FeO<sub>6</sub>] in the glass structure, and BaFe<sub>12</sub>O<sub>19</sub>

as the final crystalline phase is observed.

**Key words:** iron ore tailing; glass-ceramic; BaFe<sub>12</sub>O<sub>19</sub>; crystallization

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