Wetting behaviors of calcium ferrite on gangues in iron ore sintering process

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Abstract

A dripping method was used to investigate the wetting behaviors of calcium ferrite (CF) on gangue components (Al_2O_3, MgO, SiO_2 and TiO_2 substrate) at 1523K. The results indicated that the CF have good wettability on gangues, the initial apparent contact angle was in range of 30~50°, and the equilibrium apparent contact angle was less than 15°. The wetting of CF on Al_2O_3 and SiO_2 were dissolutive wetting, while the CF on MgO and TiO_2 were reactive wetting. The spreading width: $MgO>Al_2O_3>SiO_2>TiO_2$, the spreading duration: $MgO>Al_2O_3>TiO_2>SiO_2$, and the corrosion depth: $SiO_2>Al_2O_3>TiO_2>MgO$. The dissolution and interfacial reaction intensity significantly influenced the spreading dynamics.