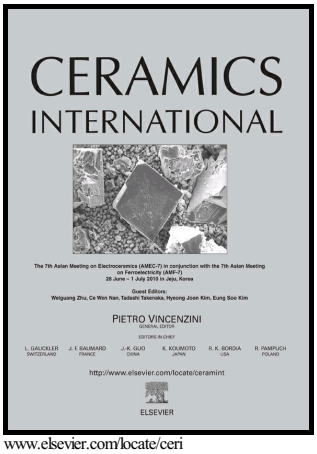

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Effects of processing parameters and rare earths additions on preparation of Al_2O_3-SiC composite powders from coal ash

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Abstract: Al_2O_3-SiC composite powders were successfully fabricated from coal ash by carbothermal reduction reaction (CRR) method in argon atmosphere. The effects of raw materials ratio, reaction temperature, La_2O_3 and Sm_2O_3 additions on the synthesis process were investigated in detail. (Question 1) Phase compositions and microstructures of Al_2O_3-SiC composite powders were characterized by XRD and SEM. Proper processing parameters and rare earths addition amounts were determined, and the formation process of Al_2O_3-SiC powders was also discussed.

Keywords: Al_2O_3-SiC; Processing parameters; La_2O_3; Sm_2O_3; Carbothermal reduction; Coal ash

1. Introduction

Coal ash is the main industrial by-product from the thermal power generation process due to the combustion of coal, which is recognized as an environmental pollutant [1]. It has caused a series of severe environmental problems like waste storage, water contamination, soil and air pollution, etc. However, on the other hand, coal ash has also been widely used n a large-scale as one of raw materials to produce construction materials, agricultural fertilizers and mine backfill materials [2, 3]. Comprehensive utilization of massive coal ash not only can significantly reduce its environmental impact, but also fulfill its added value in a great extent. In recent years, numerous research works have been carried out to fabricate highly valued ceramic composites using coal ash