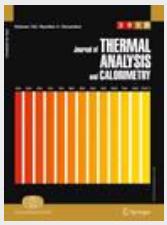
期刊文章



Study of Kinetic Parameters of Reject/Clay/Composites by Thermal Analysis

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摘要

Abstract Thermal degradation of granite and marble industry reject (GMIR), a red clay (RC) and their composites were studied by non-isothermal thermogravimetry (TG/DTG) in nitrogen atmosphere, differential thermal analysis (DTA) and derivative thermogravimetry (DTG) in air atmosphere. Measurements were made in the temperature range of 25 – 1000,25 – 1200 and 25 – 1400C. The kinetic parameters were determined by Flynn – Wall and Kissinger's methods. The results indicate the absent dominance of one mechanism of reaction, and the composites show smaller values of kinetic parameters than GMIR or RC.

Keywords

clay, composite, kinetic parameters, reject

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STUDY OF KINETIC PARAMETERS OF REJECT/ CLAY/COMPOSITES BY THERMAL ANALYSIS

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Abstract

Thermal degradation of granite and marble industry reject (GMIR), a red clay (RC) and their composites were studied by non-isothermal thermogravimetry (TG/DTG) in nitrogen atmosphere, differential thermal analysis (DTA) and derivative thermogravimetry (DTG) in air atmosphere. Measurements were made in the temperature range of 25–1000, 25–1200 and 25–1400°C. The kinetic parameters were determined by Flynn–Wall and Kissinger's methods. The results indicate the absent dominance of one mechanism of reaction, and the composites show smaller values of kinetic parameters than GMIR or RC.

Keywords: clay, composite, kinetic parameters, reject

Introduction

Granite and marble industry reject (GMIR) is a non-degradable, insoluble solid residue and it is obtained when rocks are cut in plates and furbish. X-ray diffraction (XRD) was employed to examine this reject and quartz, plagioclase, orthoclase, calcite, dolomite and mica were found in it [1–2]. This industry has developed over the last years and it has produced around 1 443 000 tons of granite and 578 000 tons of marble a year, and the amount of reject obtained is around 200 000 tons [3]. Today the companies have problems to find safe places to dispose their rejects, owing to environmental restrictions. Previously GMIR was thrown into rivers.

The name clay means a particle size smaller than two microns, a rock or a group of minerals which are known clay minerals. They belong to a group of silicates and their main minerals are kaolin, montmorillonite, chlorite, mica, sepiolite and attapulgite [4]. The first four are sheet silicates (layer lattices) and their structure is formed by layers which are formed by sheets tetrahedron and octahedron [5]. The term composites have been applied to heterophase materials when the dimensions involved approach the macroscopic. Ceramic materials are frequently considered for structural

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