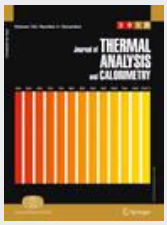
期刊文章



Differential thermal study of Mg-bearing clays from saline lakes of Southern Tunisia

期刊	Journal of Thermal Analysis and Calorimetry
出版社	Akadémiai Kiadó, co-published with Springer Science+Business Media B.V., Formerly Kluwer Academic Publishers B.V.
ISSN	1388-6150 (Print) 1572-8943 (Online)
学科	Chemistry, Sciences, Polymer Sciences, Physical Chemistry, Inorganic Chemistry, Measurement Science, Instrumentation
期	Volume 51, Number 1
文章类型	Regular Papers
页	219-230
DOI	10.1007/BF02719023
Subject Group	化学和材料科学
在线日期	2007年10月5日

PDF (626.7 KB) First Page Preview

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摘要

Abstract Clays high in Mg content occur frequently in the high saline environment of salt lakes in southern Tunisia. The DTA curves of these clays show a striking endothermic-exothermic reaction in the temperature range of 800 – 820 C. A strong correlation is observed between the intensity of these coupled reactions and the Mg content of the initial clay sample. The initial endothermic reaction is interpreted as the melting/dehydroxylation of the Mg-bearing smectites. The subsequent exothermic peak is interpreted as caused by the crystallisation of the new Mg-silicate phase enstatite. Therefore, the DTA is considered as a suitable method for the identification and relative quantification of high Mg clay minerals (e.g. trioctahedral smectites). Variations of the Mg content of the studied samples were well detectable by means of DTA, disclosing a distinct distribution pattern of the salt lake clays. Clues to bulk chemical composition of the initial clay assemblage can also be found in the results of the X-ray analysis of the firing products.

Keywords

DTA-TG, endo/exothermic double peak, enstatite, saline lake sediments, trioctahedral smectites

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Journal of Thermal Analysis, Vol. 51 (1998) 219-230

DIFFERENTIAL THERMAL STUDY OF Mg-BEARING CLAYS FROM SALINE LAKES OF SOUTHERN TUNISIA

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(Received April 23, 1997)

Abstract

Clays high in Mg content occur frequently in the high saline environment of salt lakes in southern Tunisia. The DTA curves of these clays show a striking endothermic-exothermic reaction in the temperature range of 800–820°C. A strong correlation is observed between the intensity of these coupled reactions and the Mg content of the initial clay sample. The initial endothermic reaction is interpreted as the melting/dehydroxylation of the Mg-bearing smectites. The subsequent exothermic peak is interpreted as caused by the crystallisation of the new Mg-silicate phase enstatite. Therefore, the DTA is considered as a suitable method for the identification and relative quantification of high Mg clay minerals (e.g. trioctahedral smectites). Variations of the Mg content of the studied samples were well detectable by means of DTA, disclosing a distinct distribution pattern of the salt lake clays. Clues to bulk chemical composition of the initial clay assemblage can also be found in the results of the X-ray analysis of the firing products.

Keywords: DTA-TG, endo/exothermic double peak, enstatite, saline lake sediments, trioctahedral smectites

Introduction

The DTA-TG method is commonly used for the characterisation of evaporites from modern saline lakes, e.g. Mg-sulfates or carbonates [1]. Frequently associated with these evaporites are the 'saline' clay minerals palygorskite, sepiolite and the trioctahedral smectites (saponite and stevensite). Due to the major interest in the evaporite minerals and to the extensive sample preparation for clay mineral analysis, however, clay samples from saline environments have been only sparsely studied by means of DTA-TG.

A dominant process of the clay mineral genesis in various alkaline evaporative shallow-water environments is the uptake of Mg from the brine through neo-

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0368–4466/98/ $ 5.00

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Frontiers in Organic Synthesis Technology 3. - FROST 3