C101-E042

SPECTROPHOTOMETRIC ANALYSIS 192

Determination of Metal Elements in Montmorillonite by AAS

Various ceramic materials are widely used in many fields and include oxides, silicates and their minerals as well as clay minerals. Montmorillonite is one of the clay minerals produced in mass in Japan in the form of the naturally occurring bentonite and it is widely used as an absorbent, catalyst and casting binder, among others. It is a feature of montomorillonite that its thermal property varies with the content of Fe and Mg. Here are shown examples of determination of Fe, Mg and Aℓ, another principal component, in montmorillonite.

■ Sample Pretreatment

Weigh out 0.2g of sample into a platinum crucible, add 10 mℓ of hydrofluoric acid and 5 mℓ of perchloric acid, heat and decompose in the sand bath until the white fumes of perchloric acid are released, then allow to cool and add 10 mℓ of hydrochloric acid (~18%), boil, cool gradually, add purified water to make 50 mℓ, and use as the sample stock solution.

■ Analytical Conditions

The AA-680 atomic absorption spectrophotometer used in the analysis is capable of recording data in the form shown for Fe in Fig. 1. The analytical conditions for Fe, Mg and Aℓ are shown in Table 1.

A final concentration calculation program was newly installed in the AA-680. This is a program for calculating and displaying the actual concentration of the element in the initial sample, by entering the sample weight W at the time of sample pretreatment, the specific volume L at the time of dilution, and the dilution factor M at the time of measurement. Calculated results for the elements are shown in Figs. 2, 4 and 6.

Table of Analytical Conditions

ELEMENT	ANALYTICAL LINE	FLAME	DILUTION OF SAMPLE
Fe	248.3 nm	Air-C_2H_2	× 50
Mg	285.2 nm	Air-C_2H_2	× 200
Aℓ	309.3 nm	N_2O-C_2H_2	× 25

In the determination of these elements, interference from other components was not detected, and all determinations were by the calibration curve method. However, in the measurement for magnesium, 2000 ppm of lanthanum was added to both the standard and sample solutions.

■ Determination of Fe

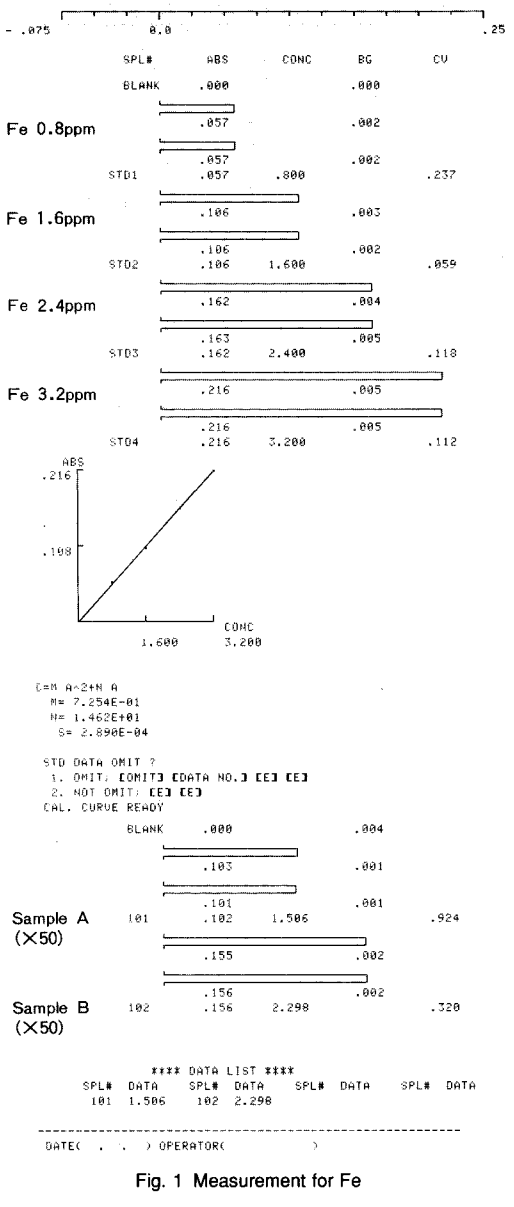

Fig. 1 Measurement for Fe

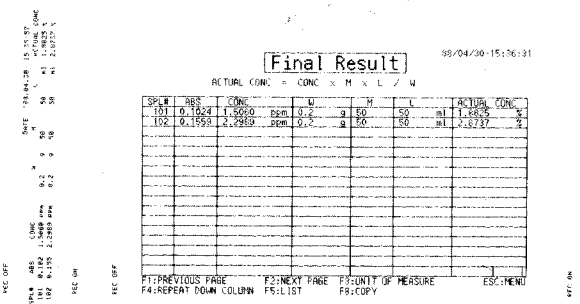

Fig. 2 Final Result for Fe

■ Determination of Mg

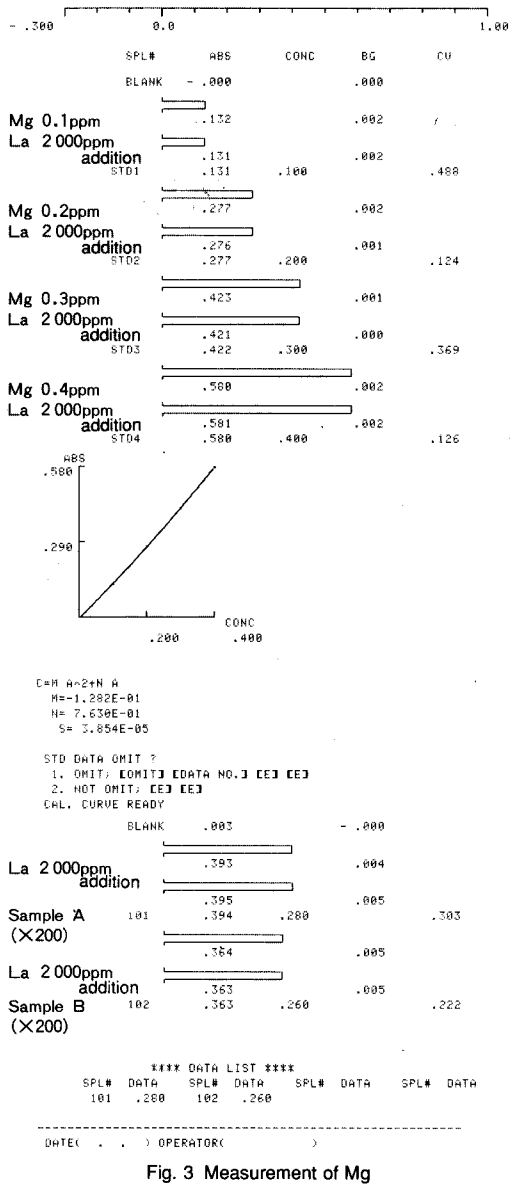

Fig. 3 Measurement of Mg

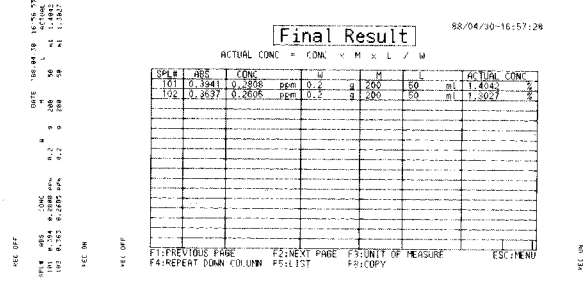

Fig. 4 Final Result for Mg

■ Determination of Aℓ

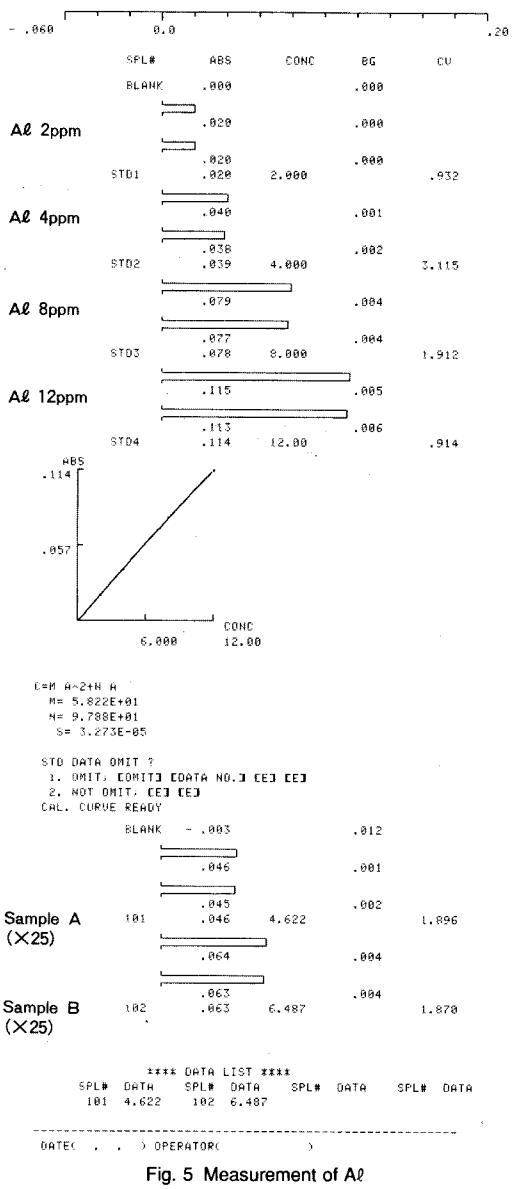

Fig. 5 Measurement of Aℓ

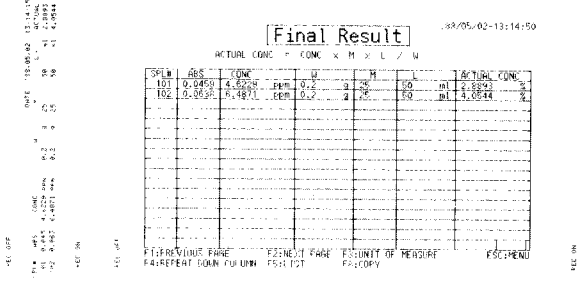

Fig. 6 Final Result for Mg

SHIMADZU

SHIMADZU CORPORATION. International Marketing Division
3, Kanda-Nishikicho 1-chome, Chiyoda-ku, Tokyo 101, Japan Phone:81(3)3219-5641 Fax.81(3)3219-5710
Cable Add.:SHIMADZU TOKYO Overseas Telex No.:0232-3291 (SHMDT J)