

TG/DTA Measurement of Cement

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1. Introduction

Cement, as one type of complex mineral, is widely used as a building material. Especially, the most typical cement is Portland cement. This brief introduces TG/DTA measurement data using Portland cement (NBS: SRM633, JCA(Japan Cement Association): 211M) prepared as a standard.

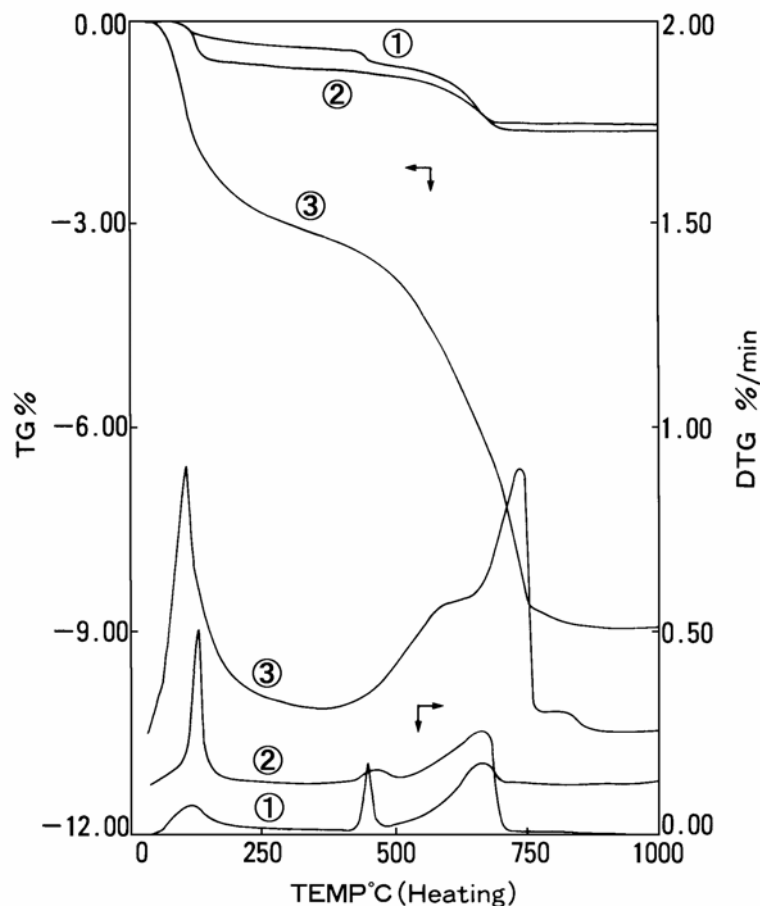


Figure 1 TG & DTG Curvs of Cement Samples

① : NBS (SRM633)

② : Cement Association (211M)

③ : NBS Hydrated

2. Measurement example

Figure 1 shows the TG & DTG data of each cement sample. Each weight loss is seemed to be as follows:

- ~ 100°C Dehydration of free water.
- 120 ~ 160°C Dehydration of gypsum crystal water.
- 400 ~ 500°C Dehydration of calcium hydroxide.
- 500 ~ 750°C Dehydration from OH of materials.

The difference of weight loss is observed in the weight loss of ① and ②, and this shows difference of the component ratio. The free water and composite OH base is also increased in the hydrated cement from ① and ③.

Figure 2 shows the DTA data of each cement sample. In each cement sample, an endothermic peak appears and a relationship exists between the weight loss and the size of the peak.

As shown above, information about the temperature of the cement was obtained through TG/DTA measurements. However, because the weight loss of cement were small, a high sensitivity TG/DTA instrument was necessary.

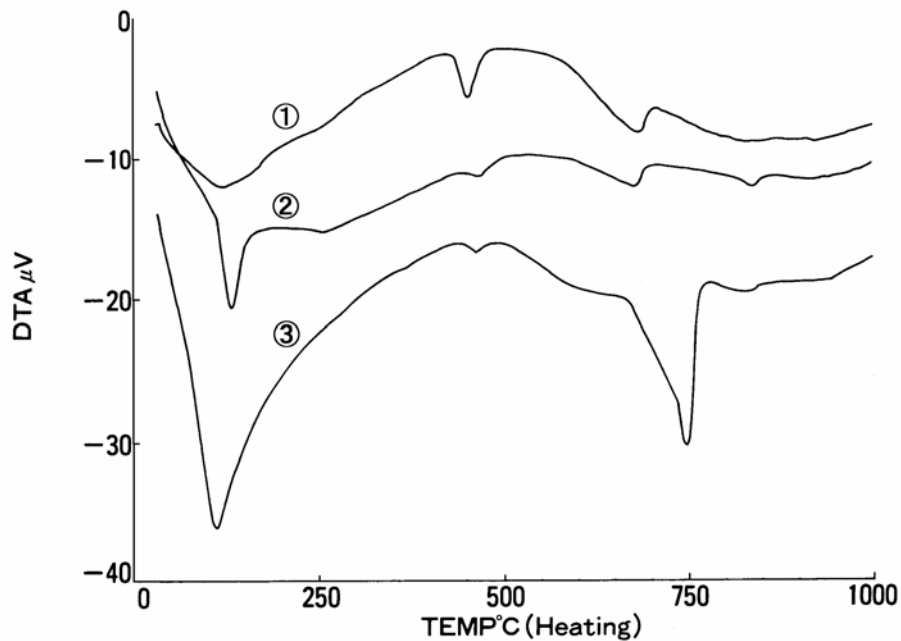


Figure 2 DTA Curves of Cement Samples
① : NBS (SRM633)
② : Cement Association (211M)
③ : NBS Hydrated