

Monitoring of Pyrolytic Gas Evolution

A new instrument for evolved gas analysis (EGA) has been developed using a skimmer interface and IA-QMS (Ion Attachment Quadrupole Mass Spectrometer). The skimmer interface is a new interface device between an infrared image furnace and an MS, for sampling of gaseous species produced by pyrolysis. It offers gas sampling with no change and higher sensitivity. The IA-QMS can measure a mass spectrum with no fragmentation during the ionization. As its application to pyrolysis of organic additives for ceramic processing, monitoring of individual polymer pyrolysis has been successfully carried out to pyrolytic gas evolution from mixtures of different polymers.

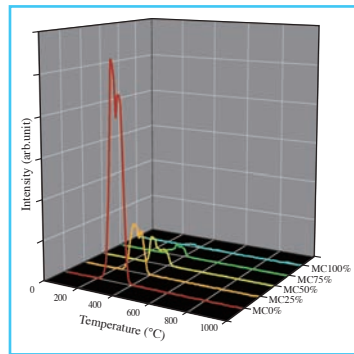


Figure 1: EGA curves of $m/z = 77$ as a specified indicator of PVA pyrolysis behavior in PVA/MC blended binder.

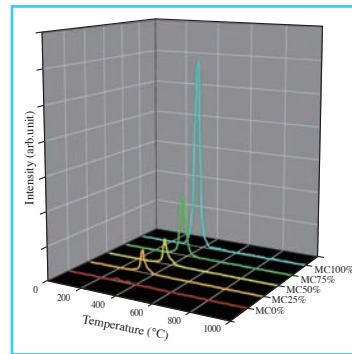


Figure 2: EGA curves of $m/z = 81$ as a specified indicator of MC pyrolysis behavior in PVA/MC blended binder.

PVA : polyvinyl alcohol
MC : methyl cellulose

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Observation Technique of Low-temperature Object by Phase-contrast X-ray Imaging

Nondestructive imaging of air clathrate hydrates

A non-destructive observation and the absolute density analysis method of air clathrate hydrates in ice core were developed. Phase-contrast X-ray CT is considered to be a powerful tool for nondestructive observation due to its high density resolution. We developed a cryochamber and a liquid cell, which enabled low-temperature X-ray CT measurements from -80°C to room temperature. The technique can be applied to the imaging of temperature-induced phase or compositional change of various materials besides various gas hydrates.

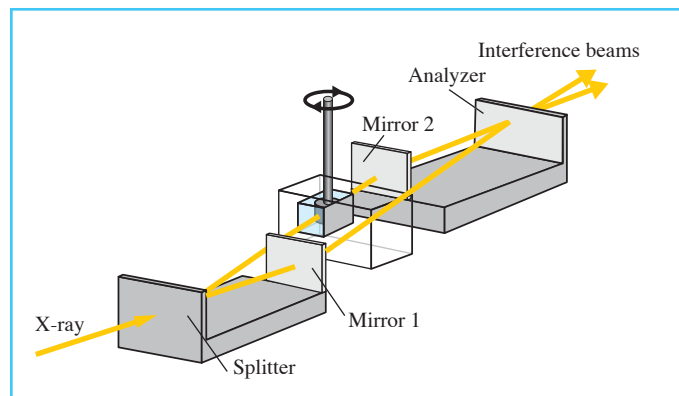


Figure : Measurement principle of a low-temperature phase contrast X-ray CT device

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