

Separation and Quantitative Analysis of Carbon and Carbonates in Surface Material of Asteroids

Background / Challenges

Background

Carbon, as a constituent of matter, is broadly classified into organic carbon and inorganic carbon. Organic carbon refers to carbon contained in organic materials, while inorganic carbon refers to elemental carbon and carbonate carbon.

The presence of carbonate in a sample taken from an unknown planet indicates the possibility of the presence of water on that planet. Therefore, the determination of carbonate is very important in space science.

Challenges

In HORIBA's EMIA carbon and sulfur analyzer, samples are heated in an oxygen atmosphere, and the carbon contained in the sample is quantitatively analyzed as CO/CO₂ gas with an infrared detector. However, in the case of combustion reactions, both inorganic and organic carbon can only be quantified as total carbon, making it difficult to distinguish.

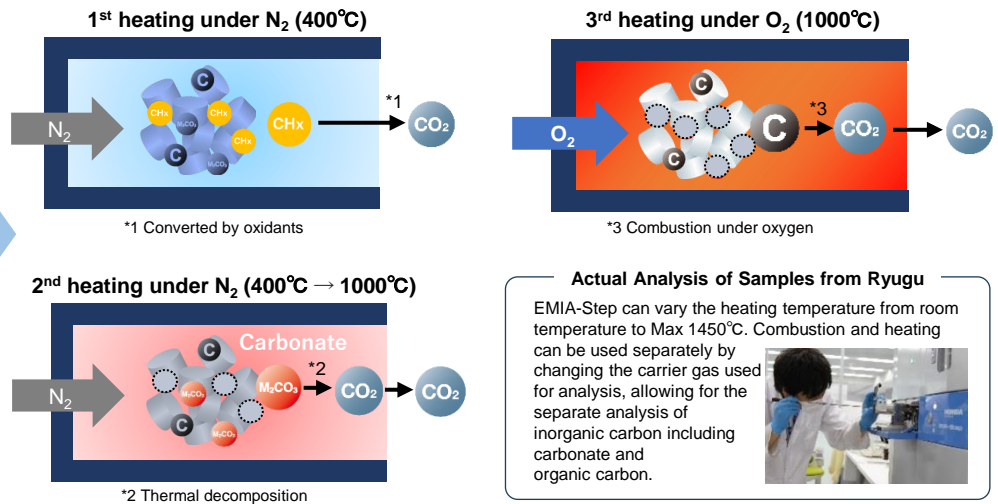
* For more information, please contact [HORIBA](mailto:info.sci@horiba.com).

Solution from HORIBA

A need to investigate the origin of the mineral.

"We would like to determine the amount of organic and inorganic carbon (especially carbonate) using a few amount of sand and stone samples collected from the asteroid Ryugu."

For more information about the analysis, please click [here](#).



Additional Unique Features for Measurement of Precious Samples

Special features can be employed for the measurement of precious samples.

Switching carrier gas

Gas switching function(1) has been added.

Purging of sample feed area

A special purge function (2) has been added at the entrance to prevent entrapment of atmospheric air. This reduces the effects of CO₂ and hydrocarbons.

Conversion of generated gas to CO₂

Organic carbon is gasified as hydrocarbons at low temperatures. An oxidizer (3) is added to detect this as CO₂ in the NDIR.

