DEVELOPMENT OF A METHOD FOR QUANTITATIVE ANALYSIS BY SYNCHROTRON RADIATION X-RAY CT, TOWARD HAYABUSA2 MISSION.

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Introduction: Hayabusa2, subsequent mission of Hayabusa, targets 1999 JU3, a C-type asteroid which thought as a parent body of carbonaceous chondrite. Synchrotron Radiation X-ray CT is one of the important tools of the initial analysis of those returned samples, because it enables us not only to observe samples three-dimensionally but also to analyze materials inside the meteorites quantitatively by estimating X-ray absorption of materials [1-4]. By comparing calculated values of Linear Attenuation Coefficient (LAC) and observed LAC values those expressed as contrasts of the slice images, we can determine materials inside the samples [2-4]. In this paper, we observed several carbonaceous chondrites by SR-X-Ray CT. Uesugi et al. [4] showed that histograms of the LAC are useful for rough determination of meteorite class. Using obtained histograms, we discuss the method for the quantitative analysis of Hayabusa2 samples.

Results and Discussions: Experiments were carried out at BL20B2 in SPring-8, Japan. X-ray CT data were obtained by optimized environment for the CT observation of meteorites [4]. Figure shows the histograms of carbonaceous chondrites obtained by 30 keV X-ray.

![Histograms of carbonaceous chondrites](image)

Corresponding materials of each peak in histograms are determined by thresholding the slice images around the peak. Peaks of chondrules appear at 3.1 cm⁻¹, 4.3 cm⁻¹ and 4.3 cm⁻¹ and peaks of matrix appear at 6.2 cm⁻¹, 8.0 cm⁻¹ and 9.2 cm⁻¹, for Murchison, Allende and Y-81020, respectively. The peak values of chondrule are equivalent to Fo# 97, 91 and 91 of olivine, and En# 96, 87 and 87 of pyroxene, for Murchison, Allende and Y-81020, respectively. These values depend on the chemical compositions of each component, and enable us to determine the meteorite class of the samples, though we should increase the number of data to increase accuracy.