

**Papers Presented to the 21st Symposium on Antarctic Meteorites
held at the National Institute of Polar Research, Tokyo
June 5-7, 1996**

1. AKAI, J., TARI, S. and TANAKA, H.
New descriptions and re-examinations on thermal metamorphisms in several Antarctic CM2 carbonaceous chondrites: Preliminary reports
2. ARAI, T. and WARREN, P. H.
VLT-mare glasses of probable pyroclastic origin in lunar meteorite breccias Yamato 793274 and QUE94281
3. BIRYUKOV, V. V. and ULYANOV, A. A.
High temperature components of Antarctic meteorite PCA91082 (CR2) and their nebular evolution
4. BÉRCZI, Sz., HOLBA, A. and LUKÁCS, B.
On discriminating chondrites on the basis of statistical analysis of iron-bearing compounds: NIPR Antarctic samples
5. BÉRCZI, Sz., KISS, A. and LUKÁCS, B.
Comparison of the reduction processes in native-iron bearing basalts from Disko Island, and in chondrites
6. BÉRCZI, Sz., KISS, A. and LUKÁCS, B.
Statistics of iron grains in the sequence of petrologic classes of LL type Antarctic NIPR chondrites
7. BÉRCZI, Sz., LUKÁCS, B. and FÖLDI, T.
Measuring water droplets as spherules in the ejecta cloud of an impact explosion into ice on Antarctica: A proposal
8. CHEN, M., XIE, X. and CHEN, B.
A comparison of thermal histories of the shock veins in two chondritic meteorites
9. CHIKAMI, J., MIKOUCHI, T., MIYAMOTO, M. and TAKEDA, H.
Mineralogical comparison of Hammadah al Hamra 126 with other ureilites
10. FUGZAN, M. M.
 ^{40}Ar - ^{39}Ar age of Y-81090 and Y-81095 chondrites
11. FUJITA, T., KOJIMA, H. and YANAI, K.
Origin of metal-troilite clasts in seven ordinary chondrites, Y-794006 (L4), Y-790126 (L6), Y-793211 (L6), Y-793213 (L6), Y-791629 (H4), Y-791686 (H5), and Y-791555 (H6)
12. FUKUOKA, T. and TAZAWA, Y.
Instrumental neutron activation analysis for μg -size of cosmic spherules
13. FUKUSHI, H. and FUJIMAKI, H.
Petrology of an impact-melted Yamato-791088 H chondrite from Antarctica
14. FUNAKI, M. and WASILEWSKI, P.
NRM carrier minerals of Allende (CV3) carbonaceous chondrite
15. HARAMURA, H., KOJIMA, H., IMAE, N., LEE, M. S., NOBUYOSHI, T., KIMURA, M. and IKEDA, Y.
Major element chemical compositions of Antarctic chondrites
16. HEWINS, R. H., YU, Y., ZANDA, B. and BOUROT-DENISE, M.
Do nebular fractionations, evaporative losses, or both, influence chondrule compositions?
17. HIYAGON, H.
In-situ analysis of oxygen isotopes in Allende chondrules using a SIMS
18. HONDA, M., NAGAI, H., NAGAO, K. and MIURA, Y. N.
Cosmogenic products in metal phase of the Brenham pallasite
19. ICHIKAWA, O. and KOJIMA, H.
The formation of silica-rich phase in a chondrule of Yamato-793495 CR chondrite
20. IKEDA, Y., EBIHARA, M. and PRINZ, M.

- Petrology and chemistry of silicate inclusions in the Miles IIE iron
21. IKEDA, Y., YAMAMOTO, T., KOJIMA, H., IMAE, N., KONG, P. and EBIHARA, M.
Yamato-791093, an anomalous IIE iron?
 22. ILLÉS-ALMÁR, E.
Alba Patera: A possible buried coronal structure on Mars
 23. IMAE, N. and KOJIMA, H.
Sulfidation textures of Y-82094 (CO3) and its petrogenesis
 24. KAIDEN, H., MIKOUCHI, T., NOMURA, K. and MIYAMOTO, M.
Chemical zoning of olivines in CO3 and LL3 chondrites
 25. KEIL, K. and WILSON, L.
Volcanic processes on small solar system bodies, with special reference to the asteroid 4 Vesta
 26. KIMURA, M. and IKEDA, Y.
Alteration of chondrules in Allende, Efremovka, Leoville and Vigarano CV3 chondrites
 27. KIMURA, S., TAMURA, N., TSUDA, N., SAITO, Y., KOIKE, C. and KAITO, C.
Size effect of aluminum ultrafine particles on formation of alumina phase
 28. KOJIMA, H. and YANAI, K.
Veins in CM chondrites
 29. KOJIMA, T. and TOMEOKA, K.
An unusual dark inclusion in the Vigarano CV3 chondrite: Possible evidence for sedimentary process on the meteorite parent body
 30. KOMURA, K., YAMAZAKI, S., YONEDA, S. and SHIMA, M.
Preliminary reports on cosmogenic nuclides in Tsukuba meteorite fell on Jan. 7, 1996
 31. KONDO, M., HASHIMOTO, H., TSUCHIYAMA, A., HIRAI, H. and KOISHIKAWA, A.
X-ray CT images of chondrites and chondrules
 32. KONG, P. and EBIHARA, M.
Unique features of an anomalous enstatite chondrite LEW87223
 33. KUBOVICS, I., BÉRCZI, Sz., LUKÁCS, B., PUSKÁS, Z. and TÖRÖK, K.
Scandinavian impactites: Ramsö sharp pebbles from Mien Lake, Sweden-A northern example for a possible origin of the terrestrial NIPR meteorites
 34. LIN, Y., KIMURA, M. and WANG, D.
Refractory inclusions in the Ningqiang carbonaceous chondrite
 35. LUKÁCS, B. and BÉRCZI, Sz.
Competition of C and H₂O for Fe in E, H, and C chondrites
 36. MARAKUSHEV, A. A.
Factors of oxygen isotopic variations in meteorites
 37. MATSUOKA, K., NAKAMURA, T., TAKAOKA, N. and NAGAO, K.
Thermal effects on noble gas abundances of dehydrated carbonaceous chondrite Yamato-86789
 38. MATSUZAKI, H., ZOPPI, U., KOBAYASHI, K., HATORI, S., IMAMURA, M. and NAGAI, H.
AMS measurement of ¹⁰Be and ²⁶Al in deep sea spherules
 39. MIKOUCHI, T. and MIYAMOTO, M.
A new member of Iherzolitic Shergottite from Japanese Antarctic meteorite collection: Mineralogy and petrology of Yamato-793605
 40. MIURA, Y. and OKAMOTO, M.
Shocked metamorphosed materials from limestone by impacts
 41. MIURA, Y. and TAKAMATSU CRATER INVESTIGATION GROUP
Complex formation of Takamatsu crater by impact
 42. MIURA, Y., OKAMOTO, M., KOBAYASHI, H., KONDOROSI, G. and FUKUYAMA, S.
Formation of quasicrystalline and new-type materials by impacts
 43. MIURA, Y. N., NAGAO, K. and SUGIURA, N.
Noble gas elemental and isotopic studies on pallasites
 44. MORIOKA, T., KIMURA, S., TSUDA, N., KAITO, C., SAITO, Y. and KOIKE, C.
Effect of structure on IR spectra of synthetic amorphous silicon oxide films

45. NAGAHARA, H. and OZAWA, K.
Evaporation of silicate melt in the system $Mg_2SiO_4-SiO_2$
46. NAGAO, K., MIURA, Y. N., HONDA, M. and NAGAI, H.
Noble gases in metal phase of the Brenham pallasite
47. NAKAMURA, N., INOUE, M. and KIMURA, M.
REE abundances in the "most pure" matrix materials from the Allende (CV) meteorite
48. NAKAMUTA, Y. and MOTOMURA, Y.
An application of X-ray powder diffraction analysis to meteorites by using a Gandolfi camera: Metamorphic temperature estimation of ordinary chondrites
49. NAYAK, V. K.
A hypothesis for the salinity of lake water and economic potential of the Lonar impact crater, India
50. NOGUCHI, T.
Matrix and chondrule rims in the Tieschitz (H3.6) chondrite
51. NOMURA, K. and MIYAMOTO, M.
Hydrothermal and heating experiments on formation of nepheline in CAIs: Implications for aqueous alteration and thermal metamorphism in parent bodies
52. OZIMA, M., WIELER, R., MARTY, B. and PODOSEK, F. A.
Comparative studies of Solar, Q- and terrestrial noble gases, and its implication on the evolution of the solar nebula
53. RAD'KO, L. V. and ULYANOV, A. A.
Unusual metal-rich clasts from the Erevan howardite
54. SATO, K., MIYAMOTO, M. and ZOLENSKY, M. E.
Absorption bands near $3 \mu m$ in diffuse reflectance spectra of carbonaceous chondrites: Comparison with C-type asteroids
55. SOHN, J. and YANG, J.
A preliminary study of carbon isotope analyses of individual hydrocarbon molecules in Murchison meteorite
56. SOLT, P.
Exploration of spherules in the Kaba meteorite fall area
57. SUGIURA, N.
Mapping of light elements distributions in iron meteorites
58. TACHIBANA, S. and TSUCHIYAMA, A.
Incongruent evaporation experiments on troilite (2): Evaporation rates under low H_2 -pressures and kinetics
59. TAKAOKA, N., NAKAMURA, T. and NAGAO, K.
A possible site trapping noble gases in Happy Canyon enstatite chondrite: Microbubbles
60. TAKEDA, H., ISHII, T., ARAI, T. and MIYAMOTO, M.
Mineralogy of Asuka 87 and 88 eucrites and crustal evolution of the HED parent body
61. TAKEDA, H. and KOJIMA, H.
Refractory inclusions in the Yamato-86751 CV3 chondrite
62. TANIMURA, I., TOMEOKA, K. and KOJIMA, T.
Chondrule rims of secondary origin in the Vigarano CV3 carbonaceous chondrite
63. TERAUCHI, M., NAKAMURA, N., NAGAO, K. and NAKAMURA, T.
Did alteration of chondrule mesostasis occur in the nebula or on the parent body?: Preliminary laser ablation study of Allende chondrule HN-3
64. TOGASHI, S., KAMIOKA, H., EBIHARA, M., YANAI, K., KOJIMA, H. and HARAMURA, H.
Trace elements of Antarctic meteorites by INAA (II)
65. TOMEOKA, K., YAMAHANA, Y., MIZUMOTO, F. and SEKINE, T.
Experimental shock metamorphism of the Murchison CM2 carbonaceous chondrite
66. TSUCHIYAMA, A., SYONO, Y. and FUKUOKA, K.
Decay rates of Na characteristic X-ray intensities during electron beam irradiation on shock-loaded albite: A potential shock barometer

67. WANG, D. and WEN, W.
Preliminary study of 7 Antarctic ordinary chondrites (H, L): A petrographical and mineral chemical comparison with Chinese modern falls
68. WARREN, P. H., KALLEMEYN, G. W., ARAI, T. and KANEDA, K.
Compositional-petrologic investigation of eucrites and the QUE94201 Shergottite
69. WASSON, J. T.
Meteoritic sampling of the Asteroid Belt
70. XIE, X. and CHEN, M.
Na-redistribution in the melt phase of Yanzhuang meteorite
71. YADA, T., NOZAKI, W., NAKAMURA, T., SEKIYA, M. and TAKAOKA, N.
Information on precursors of S-type spherules
72. YAMAGUCHI, A., SCOTT, E. R. D. and KEIL, K.
Origin of unique chondritic impact melt rocks, Ramsdorf (L) and Yamato-790964 (LL)
73. YAMANAKA, A., TSUCHIYAMA, A., TACHIBANA, S. and KAWAMURA, K.
Measurements of evaporation rates of sodium and potassium from silicate melts
74. YANO, H., ENGRAND, C. and MAURETTE, M.
Hypervelocity impact experiments using Antarctic micrometeorites
75. YUGAMI, K., TAKEDA, H., KOJIMA, H. and MIYAMOTO, M.
Mineralogy of new primitive achondrites, Y-8005 and Y-8307 and their differentiation from chondritic materials
76. ZINOVIEVA, N. G., MITREIKINA, O. B. and GRANOVSKY, L. B.
Interaction between chondrules and matrix in chondrites: Evidence from the Yamato-82133 (H3) chondrite
77. ZINOVIEVA, N. G., MITREIKINA, O. B. and GRANOVSKY, L. B.
Origin mechanism of hercynite-kamacite objects: Evidence for liquid immiscibility phenomena in the Yamato-82133 (H3) ordinary chondrite