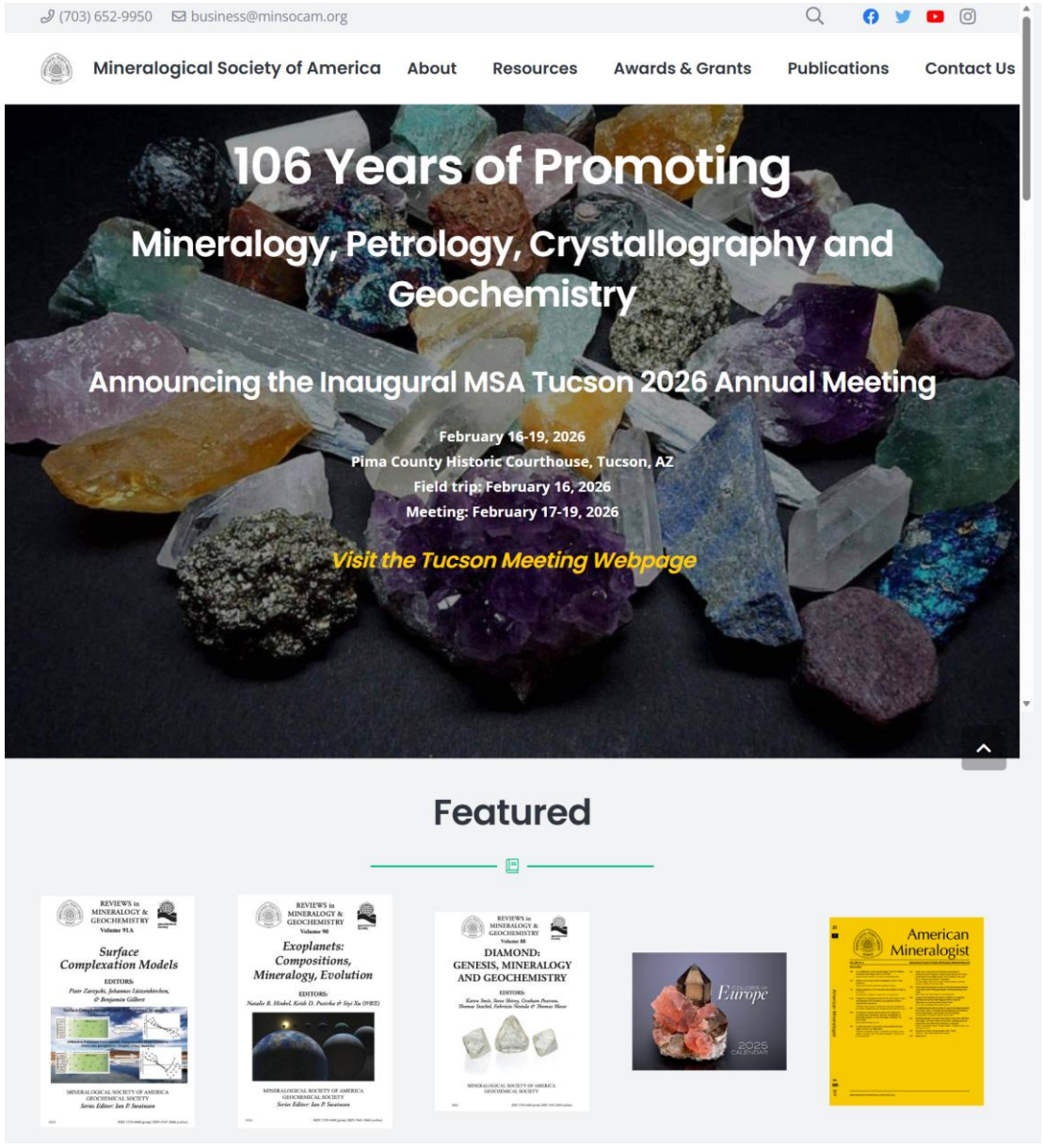
Mineralogical Society of America　アメリカ鉱物学会（MSA）



- 1919年に設立された鉱物学分野の世界で最も歴史ある学会の１つ
- 米国だけでなく世界中の研究者が参画
- 鉱物学分野に加えて、岩石学、結晶学、地球化学などの広範な地球科学分野をカバー
- 以下の３つのメダルを毎年１名づつに授与
  ローブリングメダル（最高賞）
  ダナメダル（中堅研究者）
  MSAメダル（若手研究者）

ローブリングメダル

The Roebling Medal is the highest award of the Mineralogical Society of America (MSA) for scientific eminence as represented primarily by scientific publication of outstanding original research in mineralogy. The science of mineralogy is defined broadly for purposes of the Roebling Medal, and a candidate need not qualify as a mineralogist; rather his or her published research should be related to the mineralogical sciences and should make some outstanding contribution to them. Service to mineralogy, teaching, and administrative accomplishment are not to be considered primary merit for the award. The nomination needs to be supported by the nominee's published work. The award is not restricted to U.S. citizens. Nationality, personality, age of candidate, or place of employment shall not be considered for the award; however, current members of MSA Council are not eligible to be considered for the award.

The first ten years of the Society were reviewed at the Society's 1929 annual meeting. It was concluded that it would be very helpful if the Society had the means to establish awards to be given to outstanding investigators in America or abroad, or to the authors of contributions judged as noteworthy. The hope was that the recipient of an MSA medal or prize would be recognized as a signal honor. The MSA Council agreed that it would be eminently fitting to make provision for a medal in honor of Colonel Washington A. Roebling (1837-1926), engineer, bridge builder, mineral collector, and significant friend of the Society. A fund was established and annual additions were made to it from the treasury until the amount was sufficient to make the first award. The first award could be made in 1937.

Colonel Roebling first became interested in minerals while a student at the Rensselaer Polytechnic institute, Troy, NY. It was during the period of long convalescence from the bends, developed during work on the caisson of the Brooklyn Bridge, that his interest in minerals intensified. This interest continued during the remainder of his life and resulted in an unusually excellent collection numbering about 16,000 specimens. Many of the newer and rarer minerals were represented by type material. Colonel Roebling freely permitted his specimens to be used for scientific purposes, and in this way he contributed directly to the publication of many important papers. Following his death on July 21, 1926, his son, John A. Roebling, presented his collection and an endowment to maintain it to the National History Museum, Smithsonian Institution, Washington, DC. Of the firmly established 1500 known mineral species of the time, the Roebling collection lacked less than 15 of those.

Immediately after its founding in 1919, Colonel Roebling became identified with the Mineralogical Society of America. In 1924 he served as Vice-President. He followed the development of the Society with keen interest and was much concerned that it should grow in strength and influence. To assist in attaining these goals, Colonel Roebling made a substantial gift to the Society shortly before his death. The naming of the Roebling Medal expresses MSA's great appreciation of his significant contributions to mineralogy and to the furtherance of the objectives of the Society. It was hoped that the award would not only keep the memory of Washington A. Roebling alive, but that the medal would come to signify the highest recognition of achievement mineralogy can bestow.

- 鉱物学分野の卓越した独創的研究論文発表者に与えられるMSAの最高賞
- 鉱物学者である必要はないが、発表した論文の鉱物科学に関連した幅広い分野の発展への顕著な貢献が評価
- 研究以外の教育面の貢献や、運営・管理業務等の実績は重要視しない
- 候補者の国籍、年齢、所属等を問わない

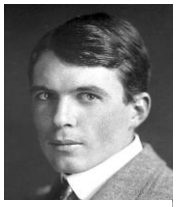
これまでの受賞者

- 1937年: Charles Palache
- 1938年: Waldemar T. Schaller
- 1940年: Leonard James Spencer
- 1941年: Esper S. Larsen, Jr.
- 1945年: Edward H. Kraus
- 1946年: Clarence S. Ross
- 1947年: Paul Niggli
- 1948年: ローレンス・ブラッグ (William Lawrence Bragg)
- 1949年: Herbert E. Merwin
- 1950年: ノーマン・ボウエン (Norman L. Bowen)
- 1952年: Frederick E. Wright
- 1953年: ウィリアム・フォーシャグ (William F. Foshag)
- 1954年: Cecil Edgar Tilley
- 1955年: Alexander N. Winchell
- 1956年: Arthur F. Buddington
- 1957年: Walter F. Hunt
- 1958年: Martin J. Buerger
- 1959年: Felix Machatschki
- 1960年: Tom F.W. Barth
- 1961年: パウル・ラムドール (Paul Ramdohr)
- 1962年: John W. Gruner
- 1963年: John Frank Schairer
- 1964年: Clifford Frondel
- 1965年: Adolf Pabst
- 1966年: Max H. Hey
- 1967年: ライナス・ポーリング (Linus Pauling)
- 1968年: 伊藤貞市 (Tei-ichi Ito)
- 1969年: フリッツ・ラーベス (Fritz Laves)
- 1970年: George W. Brindley
- 1971年: J.D.H. Donnay
- 1972年: Elburt F. Osborn
- 1973年: George Tunell
- 1974年: Ralph E. Grim
- 1975年: Michael Fleischer
- 1975年: O. Frank Tuttle
- 1976年: Carl W. Correns
- 1977年: Raimond Castaing
- 1978年: James B. Thompson
- 1979年: W.H. Taylor
- 1980年: Dmitrii S. Korzhinskii
- 1981年: ロバート・ガレルズ (Robert M. Garrels)
- 1982年: Joseph V. Smith
- 1983年: Hans P. Eugster
- 1984年: Paul B. Barton, Jr.
- 1985年: Francis J. Turner
- 1986年: Edwin Roedder
- 1987年: Gerald V. Gibbs
- 1988年: Julian R. Goldsmith
- 1989年: ヘレン・メーガウ (Helen D. Megaw)
- 1990年: Sturges W. Bailey
- 1991年: E-An Zen
- 1992年: ハットン・ヨーダー (Hatten S. Yoder, Jr.)
- 1993年: Brian Mason
- 1994年: William A. Bassett
- 1995年: William S. Fyfe
- 1996年: Donald H. Lindsley
- 1997年: Ian Carmichael
- 1998年: C. Wayne Burnham
- 1999年: 久城育夫 (Ikuo Kushiro)
- 2000年: Robert C. Reynolds, Jr.
- 2001年: Peter J. Wyllie
- 2002年: Werner F. Schreyer
- 2003年: Charles T. Prewitt
- 2004年: Francis R. (Joe) Boyd
- 2005年: 毛河光 (Ho-kwang Mao)
- 2006年: W. Gary Ernst
- 2007年: Gordon E. Brown, Jr.
- 2008年: Bernard W. Evans
- 2009年: Alexandra Navrotsky
- 2010年: Robert C. Newton
- 2011年: Juhn G. Liou
- 2012年: Harry W. Green
- 2013年: Frank C. Hawthorne
- 2014年: Bernie Wood
- 2015年: Rodney C. Ewing
- 2016年: Robert M. Hazen
- 2017年: Edward Stolper
- 2018年: E. Bruce Watson
- 2019年: Peter R. Buseck
- 2020年: Andrew Putnis
- 2021年: George Rossman
- 2022年: John W. Valley
- 2023年: Georges Calas
- 2024年: Nancy Ross
- 2025年: M. Darby Dyar
- 2026年: 入舩徹男 (Tetsuo Irifune)

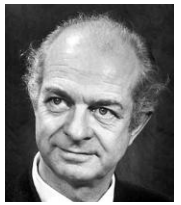
IMAメダリスト

Wikipediaより

ノーベル賞受賞者



William Lawrence Bragg (1948)



Linus Pauling (1967)

日本人受賞者

伊藤貞一 (1968)

久城育夫 (1999)

MSA会長からの受賞者に決定のメッセージ

差出人: Bodnar, Robert
送信: 2025 年 11 月 8 日 (土曜日) 5:54
宛先: irifune@dpc.ehime-u.ac.jp
件名: Good News from the President of the Mineralogical Society of America

Dear Dr. Irifune,

As the President of the Mineralogical Society of America, It is my pleasure to inform you that you are being awarded the Roebling Medal for 2026. The Roebling Medal is the highest award of the Mineralogical Society of America (MSA) for scientific eminence as represented primarily by scientific publication of outstanding original research in mineralogy. Your selection was recommended by the MSA Roebling Committee and enthusiastically supported by the MSA Council. The medal will be presented during the MSA luncheon at the 2026 Geological Society of America Meeting in Denver, Colorado. I am honored to offer you congratulations on behalf of many of your colleagues in the Mineralogical Society of America.

Additional information will be provided from the MSA office, but I am happy to answer any questions you might have. Please reply to confirm that you have received this message and that you are willing to accept the 2026 Roebling Medal.

Again, congratulations on this honor and on your outstanding contribution to the mineralogical sciences. I look forward to congratulating you in person.

Best wishes,

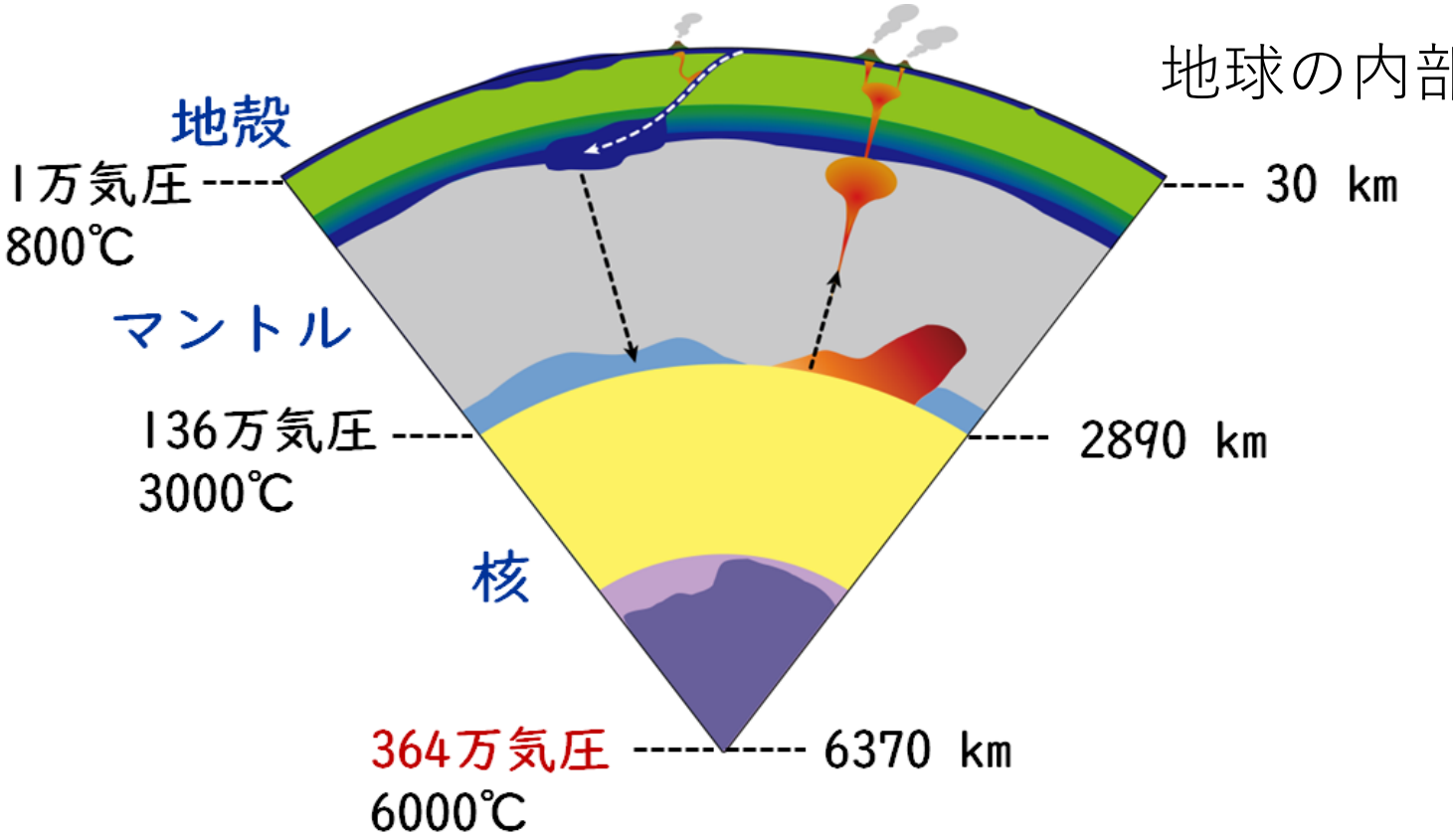
Bob

President, Mineralogical Society of America

Robert J. Bodnar
University Distinguished Professor
C. C. Garvin Professor
Department of Geosciences (0420)
4044 Derring Hall
926 West Campus Drive
Virginia Tech
Blacksburg, VA 24061

米国地質学会中に授賞式・受賞講演
（コロラド州デンバー、2026年10月）

地球の内部



世界最大を含む、GRCの世界最多の大型超高圧実験装置群

T. Irifune高被引用度論文（Google Scholarより）

③ Ultrahard polycrystalline diamond from graphite T Irifune, A Kurio, S Sakamoto, T Inoue, H Sumiya Nature 421 (6923), 599-600	993	2003
① Phase transformations in subducted oceanic crust and buoyancy relationships at depths of 600–800 km in the mantle T Irifune, AE Ringwood Earth and Planetary Science Letters 117 (1-2), 101-110	545	1993
Absence of an aluminous phase in the upper part of the Earth's lower mantle T Irifune Nature 370 (6485), 131-133	395	1994
Nature of the 650–km seismic discontinuity: implications for mantle dynamics and differentiation AE Ringwood, T Irifune Nature 331 (6152), 131-136	388	1988
Stability of magnesite and its high-pressure form in the lowermost mantle M Isshiki, T Irifune, K Hirose, S Ono, Y Ohishi, T Watanuki, E Nishibori, ... Nature 427 (6969), 60-63	346	2004
An experimental investigation of the pyroxene-garnet transformation in a pyrolite composition and its bearing on the constitution of the mantle T Irifune Physics of the Earth and Planetary Interiors 45 (4), 324-336	343	1987
② The postspinel phase boundary in Mg2SiO4 determined by in situ X-ray diffraction T Irifune, N Nishiyama, K Kuroda, T Inoue, M Isshiki, W Utsumi, ... Science 279 (5357), 1698-1700	330	1998
Subduction of continental crust and terrigenous and pelagic sediments: an experimental study T Irifune, AE Ringwood, WO Hibberson Earth and Planetary Science Letters 126 (4), 351-368	329	1994
Experimental determination of element partitioning between silicate perovskites, garnets and liquids: constraints on early differentiation of the mantle T Kato, AE Ringwood, T Irifune Earth and Planetary Science Letters 89 (1), 123-145	299	1988
Phase transformations in primitive MORB and pyrolite compositions to 25 GPa and some geophysical implications T Irifunea, AE Ringwood High‐Pressure Research in Mineral Physics: A Volume in Honor of Syun‐iti …	299	1987
Phase transformations in a harzburgite composition to 26 GPa: implications for dynamical behaviour of the subducting slab T Irifune, AE Ringwood Earth and Planetary Science Letters 86 (2-4), 365-376	293	1987
Stability of hydrous silicate at high pressures and water transport to the deep lower mantle M Nishi, T Irifune, J Tsuchiya, Y Tange, Y Nishihara, K Fujino, Y Higo Nature Geoscience 7 (3), 224-227	291	2014
Iron partitioning and density changes of pyrolite in Earth's lower mantle T Irifune, T Shinmei, CA McCammon, N Miyajima, DC Rubie, DJ Frost Science 327 (5962), 193-195	288	2010
Phase relations and volume changes of hafnia under high pressure and high temperature O Ohtaka, H Fukui, T Kunisada, T Fujisawa, K Funakoshi, W Utsumi, ... Journal of the American Ceramic Society 84 (6), 1369-1373	278	2001
A new high-pressure form of $MgAl_2O_4$ T Irifune, K Fujino, E Ohtani Nature 349 (6308), 409-411	271	1991
The eclogite-garnetite transformation at high pressure and some geophysical implications T Irifune, T Sekine, AE Ringwood, WO Hibberson Earth and Planetary Science Letters 77 (2), 245-256	249	1986
Hardness and deformation microstructures of nano-polycrystalline diamonds synthesized from various carbons under high pressure and high temperature H Sumiya, T Irifune Journal of materials research 22 (8), 2345-2351	233	2007
Phase relations and equations of state of ZrO_2 under high temperature and high pressure O Ohtaka, H Fukui, T Kunisada, T Fujisawa, K Funakoshi, W Utsumi, ... Physical Review B 63 (17), 174108	210	2001
An experimental study of the garnet-perovskite transformation in the system MgSiO3 Mg3Al2Si3O12 T Irifune, T Koizumi, J Ando Physics of the Earth and Planetary Interiors 96 (2-3), 147-157	207	1996
Sound velocities of majorite garnet and the composition of the mantle transition region T Irifune, Y Higo, T Inoue, Y Kono, H Ohfuji, K Funakoshi Nature 451 (7180), 814-817	182	2008

研究論文（約500編）

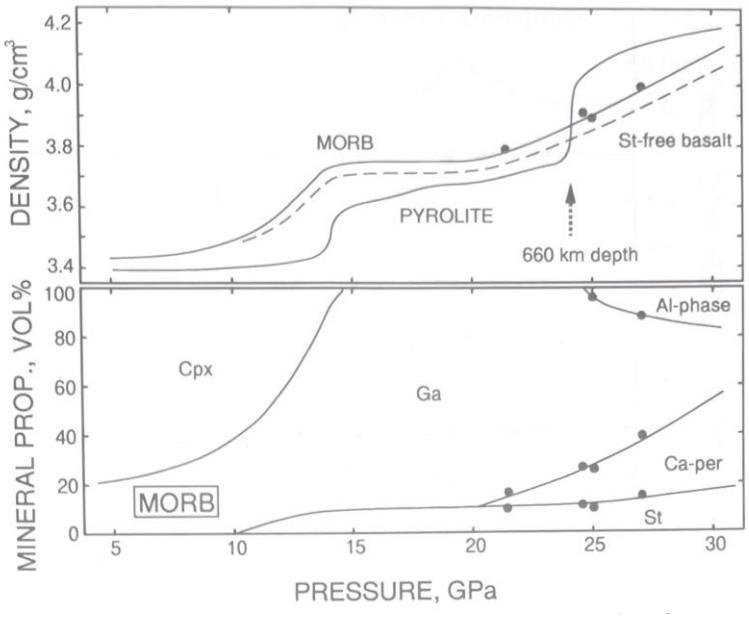
①マントルと沈み込むプレート中の鉱物の結晶構造と密度の変化

②放射光X線その場観察による鉱物の結晶構造・弾性波速度変化

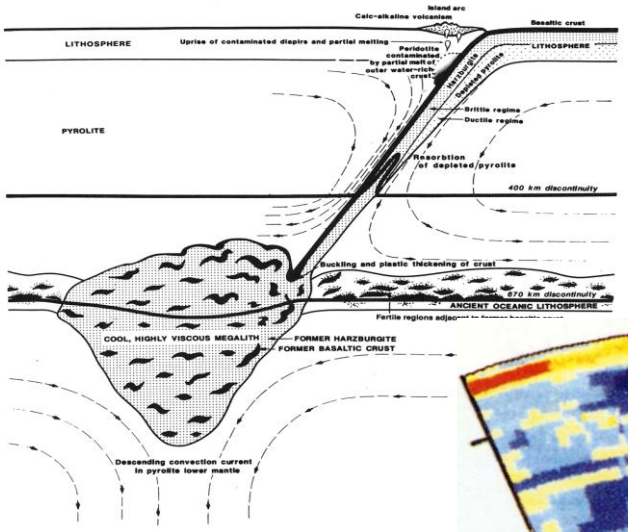
③ナノ多結晶ダイヤモンド（ヒメダイヤ）と透明ナノセラミックスの合成

＊10編のNature論文、3編のScience論文などインパクトの高い論文発表

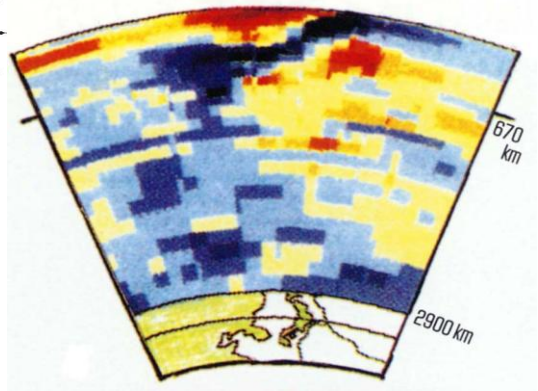
① マントルとプレート中の結晶構造と密度の変化



Irifune & Ringwood (1993)



Ringwood & Irifune (1988)



Fukao et al. (1992)

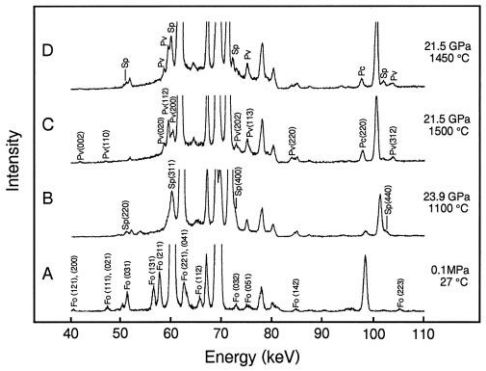
マントルと、そこに沈み込むプレート中の鉱物の結晶構造と密度の変化を超高圧実験により明らかにし、沈み込むプレートが深さ660 km付近に停滞し、巨大な構造体（メガリス）を形成することを示唆

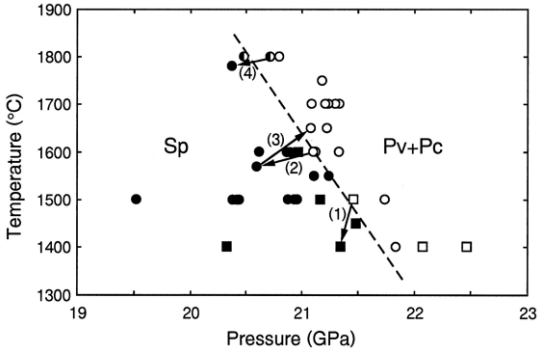
⇒　後に地震波トモグラフィーによりメガリスの存在が確認される

映画「日本沈没」（2006）、小説「華竜の宮」（2010 SF大賞）

Ringwood & Irifune, Nature (1988), Irifune & Ringwood, EPSL (1993), Irifune et al., Science (2010)など

② X線その場観察による鉱物の結晶構造・弾性波速度変化





Irifune et al. (1998)

週刊ポスト 1998.10

マントルを構成する主要な鉱物であるかんらん石の、結晶構造変化の圧力をX線その場観察実験により精密測定

⇒ 世界最大の第３世代放射光施設（SPring-8）完成後、全体で最初の研究成果

Irifune et al., Science (1998), Irifune et al., Nature (2008), Greaux, Irifune et al., Nature (2019)など

③ ナノ多結晶ダイヤモンドと透明ナノセラミックスの合成

ナノ多結晶ダイヤモンド

透明ナノセラミックス

世界最大超高圧合成装置
BOTCHAN-6000

超高圧合成法を応用し、天然のダイヤモンドを越える硬さを持つ「世界最硬」ナノ多結晶ダイヤモンド（ヒメダイヤ）の合成に成功

⇒ 製品化・多様な超高圧科学への応用と「超高圧材料科学」分野の開拓

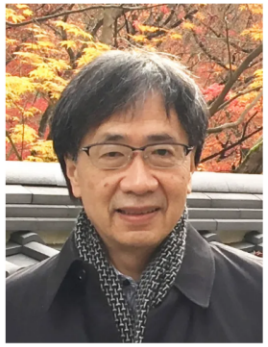
Irifune et al., Nature (2003), Irifune et al., Nature Communications (2016)など

【参考】
International Mineralogical Association　国際鉱物学連合（IMA）

International Mineralogical Association

News　About　Member Organizations　Commissions and Working Groups　Awards　Meetings　Publications

Tetsuo IRIFUNE is 2023 IMA medalist.



Tetsuo Irifune is a Prof. of Geodynamics Research Center, Ehime University (Japan).

Pioneer in the development of new methods for the generation of ultrahigh pressures and temperatures in large volume press, Prof. Tetsuo Irifune has reached the highest level of scientific excellence and eminence within the international mineral physics community by setting new standards in the performance of multi-anvil high-pressure experiments with applications to deep Earth processes, and to materials science, including the first synthesis of ultra-hard nano-polycrystalline diamond and transparent nano-ceramics. Thanks to his ability to innovate and develop new techniques, he expanded the scope of mineralogy to entirely new scientific frontiers and extended the boundaries of knowledge. His work has consistently been at the cutting edge of research in mineral physics over a wide range of fields, from hydrous and anhydrous phase relations through novel diamond and ceramics synthesis to techniques of in situ analysis with impact across mantle geochemistry, seismology and geodynamics.

Read the article in Elements

IMA was founded in 1958 as the the world's largest organization promoting mineralogy, one of the oldest branches of science. 36 national mineralogical societies or groups are members of IMA. The Association supports the activities of several Commissions and Working Groups at the cutting edge of mineralogy and facilitates interactions among mineralogists by sponsoring and organizing meetings.

- 1958年に設立された36か国の鉱物学関連学会の連合体
- 2008年にIMAメダルを創設し、毎年１名の受賞者を選出
- 鉱物科学の特定の重要分野での卓越した業績が評価
- 2023年の受賞者として入舩が選出（受賞式等延期）
- 日本人では大谷栄治東北大学名誉教授に続いて２人目
- IMAメダルとRoeblingメダルの両方の受賞は世界で３人目、日本人では初めて

国際鉱物学連合総会中に授賞式・受賞講演
（南京、2026年8月）