



Advances in high-pressure technology for geophysical applications /

Chen, Jiuhua (1962-)

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dissertations.

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Academic theses.

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Monografía

High-pressure mineral physics is a field that is strongly driven by the development of new technology. Fifty years ago, when experimentally achievable pressures were limited to just 25 GPa, little was known about the mineralogy of the Earth's lower mantle. Silicate perovskite, the likely dominant mineral of the deep Earth, was identified only when the high-pressure techniques broke the pressure barrier of 25 GPa in 1970s. However, as the maximum achievable pressure reached beyond one Megabar (100 GPa) and even to the pressure of Earth's core on minute samples, new discoveries increasingly were fostered by the development of new analytical techniques and improvements in sensitivity and precision of existing techniques. The book consists of six sections which group the papers according to their main topics: a) Elastic and Anelastic Properties; b) Rheology; c) Melt and Glass Properties; d) Structural and Magnetic Properties; e) Diffraction and Spectroscopy; f) Pressure Calibration and Generation. As many papers cover multiple topics, readers may find papers of interest in different sections. All papers are prepared with emphasis on technical details suitable for a technical reference. Many on-line software resources are also listed in as detailed a manner as possible. However, the URL of the software sites may be subject to change without notice. * State of the art in a very important branch of geophysics, namely the experimental determination of material behavior at the extreme conditions of planetary interiors * Emphasis on technical details suitable for a technical reference * Includes many on-line software resources

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Contenido: Direct measurements of the elastic properties of iron and cobalt to 120 GPa : implications for the composition of earth's core / Jonathan C. Crowhurst, Alexander F. Goncharov and Joseph M. Zaug -- A gigahertz ultrasonic interferometer for the diamond anvil cell and high-pressure elasticity of some iron-oxide minerals / Steven D. Jacobsen, Hans J. Reichmann, Anastasia Kantor and Hartmut A. Spetzler -- Simultaneous equation of state, pressure calibration and sound velocity measurements to lower mantle pressures using multi-anvil apparatus / Baosheng Li, Jennifer Kung, T. Uchida and Yanbin Wang -- Simultaneous determination of elastic and structural properties under simulated mantle conditions using multi-anvil device MAX80 / Hans J. Mueller, Christian Lathe and Frank R. Schilling -- Laboratory measurement of seismic wave dispersion and attenuation at high pressure and temperature / Ian Jackson -- High-temperature plasticity measurements using synchrotron X-rays / Donald J. Weidner, Li Li, William Durham and Jihua Chen -- Stress and strain measurements of polycrystalline materials under controlled deformation at high pressure using monochromatic synchrotron radiation / Takeyuki Uchida, Yanbin Wang, Mark L. Rivers and Steve R. Sutton -- Development of a rotational Drickamer apparatus for large-strain deformation experiments at deep Earth conditions / Yousheng Xu, Yu Nishihara and Shun-ichiro Karato -- Density measurements of molten materials at high pressure using synchrotron X-ray radiography: Melting volume of FeS / Jihua Chen, Donald J. Weidner, Liping Wang, Michael T. Vaughan and Christopher E. Young -- Viscosity and density measurements of melts and glasses at high pressure and temperature by using the multi-anvil apparatus and synchrotron X-ray radiation / E. Ohtani, A. Suzuki, R. Ando, S. Urakawa, K. Funakoshi and Y. Katayama -- The effect of composition, compression, and decompression on the structure of high-pressure aluminosilicate glasses: An investigation utilizing p17(BO and p27(BAl NMR / Jeffrey R. Allwardt, Jonathan F. Stebbins, Burkhard C. Schmidt and Daniel J. Frost -- The application of p17(BO and p27(BAl solid-state (3QMAS) NMR to structures of non-crystalline silicates at high pressure / Sung Keun Lee, Yingwei Fei, George D. Cody and Bjorn O. Mysen -- Decompression of majoritic garnet : an experimental investigation of mantle peridotite exhumation / Larissa F. Dobrzhinetskaya, Harry W. Green, Alex P. Renfro and Krassimir N. Bozhilov -- Chemistry at extreme conditions: Approaching the Earth's major interface / Leonid Dubrovinsky, Natalia Dubrovinskaya, Alexei Kuznetsov and Innokenty Kantor -- Pressure dependence on the magnetic properties of titanomagnetite using the reversible susceptibility method / Stuart A. Gilder and Maxime LeGoff -- High-pressure angle-dispersive powder diffraction using an energy-dispersive setup and white synchrotron radiation / Yanbin Wang, Takeyuki Uchida, Robert Von Dreele, Akifumi Nozawa, Ken-ichi Funakoshi, Norimas Nishiyama and Hiroshi Kaneko -- Methods and application of the Paris-Edinburgh Press to X-ray diffraction structure solution with large-volume samples at high pressures and temperatures / Wilson A. Crichton and Mohamed Mezouar -- High-pressure structure determination and refinement by X-ray diffraction / Ross J. Angel -- Nuclear resonant inelastic X-ray scattering and synchrotron Mössbauer spectroscopy with laser-heated diamond anvil cells / Jung-Fu Lin, Wolfgang Sturhahn, Jiyong Zhao, Guoyin Shen, Ho-kwang Mao and Russell J. Hemley -- In situ raman spectroscopy with laser-heated diamond anvil cells / Mario Santoro, Jung-Fu Lin, Viktor V. Struzhkin, Ho-kwang Mao and Russell J. Hemley -- Calibration based on a primary pressure scale in a multi-anvil device / Hans J. Mueller, Frank R. Schilling, Christian Lathe and Joern Lauterjung -- High-pressure generation in the Kawai-type apparatus equipped with sintered diamond anvils: Application to the wurtzite-rocksalt transformation in GaN / Eiji Ito, Tomoo Katsura, Yoshitaka Aizawa, Kazuyuki Kawabe, Sho Yokoshi, Atsushi Kubo, Akifumi Nozawa and Ken-ichi Funakoshi -- Development of high P-T neutron diffraction at LANSCE-toroidal anvil press, TAP-98, in the HIPPO diffractometer / Yusheng Zhao, Duanwei He, Jiang Qian, Cristian Pantea, Konstantin A. Lokshin, Jianzhong Zhang and Luke L. Daemen -- A new optical capillary cell for spectroscopic studies of geologic fluids at pressures up to 100 MPa / I-Ming Chou, Robert C. Burruss and Wanjun Lu -- Internal and external electrical heating in diamond anvil cells / Natalia Dubrovinskaya and Leonid Dubrovinsky -- A new gasket material for higher resolution NMR in diamond anvil cells / Takuo Okuchi, Ho-kwang Mao and Russell J. Hemley pt. I. Elastic and anelastic properties -- pt. II. Rheology -- pt. III. Melt and glass properties -- pt. IV. Structural and magnetic properties -- pt. V. Diffraction and spectroscopy -- pt. VI. Pressure calibration and generation

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