## EARTH & PLANETARY



"Nemunoki" - Persian silk tree



"Noibara" - Multiflora rose





## SCIENCE

ynchrotron radiation techniques available at SPring-8 have opened new directions of research in Earth and Planetary Sciences ranging from the solar system to Earth's core, and outstanding results, including numerous breakthroughs, have been achieved since the beginning of public use in 1997. The rapid growth in research on Earth and planetary materials has been made possible by the development and upgrading of X-ray techniques, and analytical methods based on third-generation synchrotron radiation such as diffraction, spectroscopy, scattering, and imaging. All the scientific instrumentation and techniques at the beamlines have also been constantly upgraded for each specific application to their current state-of-the-art level.

In the present issue, we have chosen some representative studies in the categories of Earth and Planetary Science: volcanology and high-pressure research on Earth's core. The first topic by Nakamura *et al.* is volcanic textures studied by three-dimensional X-ray microtomography. They observed networks of shear-induced bubbles in a sheared rhyolitic sample. The result can provide an understanding of the mechanism of degassing that controls the type of volcanic eruption. The next two topics on the high-pressure and high-temperature research of Earth/planetary core materials are presented by Tsuno *et al.* and Sata *et al.*, who carried out X-ray radiography observations using the multianvil apparatus and X-ray diffraction experiments in a laser-heated diamond-anvil cell, respectively. The last topic by Murakami *et al.* is a study on a newly developed simultaneous measurement system using a laser-heated diamond-anvil cell, which consists of X-ray diffraction and Brillouin scattering spectroscopy. This developed system enables us to investigate the elastic properties and seismic wave velocity data of materials deep in the Earth because it provides strong constraints for the global seismic model of the Earth.

Yasuo Ohíshí

