A SQUID Microscope Using a Hollow-Structured Cryostat for Scanning Room-Temperature Rock Samples

J. Kawai[1], M. Miyamoto[1], H. Ogata[1], H. Oda[2], I. Miyagi[2], M. Sato[2], J. Fujihira[3]

[1]Kanazawa Institute of Technology, Kanazawa, Japan
[2]Geological Survey of Japan, National Institute of Advanced Industrial Science Technology, Tsukuba, Japan
[3] FEDLIC Co. Ltd., Tsukuba, Japan

E-mail: j-kawai@neptune.kanazawa-it.ac.jp

Abstract — We developed a high-resolution superconducting quantum interference device (SQUID) microscope, which employs a hollow cryostat, for magnetic field imaging of rock samples at room temperature. A directly coupled low temperature SQUID with a 0.2 x 0.2 mm2 pick-up loop, mounted on a sapphire conical rod, is separated from a sample at room temperature through a vacuum gap and a 40-micrometer-thick sapphire window. Precise and repeatable adjustment of the vacuum gap is performed by rotating a micrometer spindle connected to the sapphire rod through the hollow of the cryostat. We have achieved the separation of 0.23 mm between the SQUID and a sample. We also demonstrated imaging of the magnetic field of a zircon crystal having magnetite grains.

Keywords (Index Terms) — SQUID microscope, magnetic imaging, geological sample.