Tohoku Univ. Technology

# Magnetic DC/AC susceptibility measurement device

**Able to measure AC susceptibility of thin film and nanoparticle**

**Able to measure simultaneously DC & AC susceptibility**

## Overview

In conventional magnetic AC susceptibility measurement to measure magnetic material property, the susceptibility is detected by AC frequency. This disable to measure small amount of sample such as thin film and nanoparticle at low frequency (< 1 kHz) due to crowding of unbalanced voltage and detected voltage. Therefore, it is not possible to apply it to biomagnetic sensing.

DC / AC susceptibility is measured by different methods, and although measuring equipment with both measurement modes exists, simultaneous measurement is not possible.

This invention combines magnetic AC susceptibility measurement and new analysis method based on Vibrating Sample Magnetometry (VSM), a method to measure DC susceptibility.

This enables AC susceptibility detection in sideband frequency, improving detection sensitivity and enabling AC susceptibility measurement of small amount of sample that could not be measured so far. Moreover, simultaneous measurement of DC and AC susceptibility is also possible. Another major advantage is that it could be simply producedd by combining analysis method with conventional measurement equipment.

## Product Application

- AC susceptibility measurement of small volume sample such as thin film and nanoparticle
- Simultaneous measurement of DC and AC susceptibility

## IP Data

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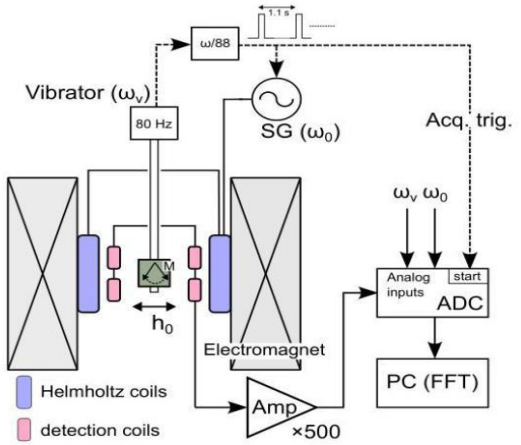
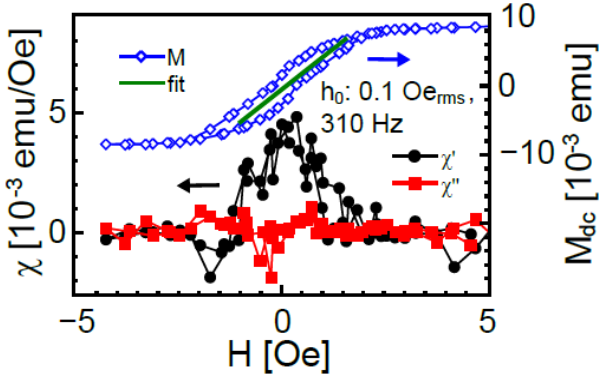
|---|---|---|
| IP No. | : | JP2023-074308 |
| Inventor | : | Muftah Al-Mahdawi, OOGANE Mikihiko |
| Admin No. | : | T22-278 |




Setup of this invention

## AC susceptibility verification on a 100-nm-thick NiFe thin film sample




Measurement sample: NiFe-100nm thin film sample

## Related Works


[1] M. Al-Mahdawi, M. Oogane, "AC susceptibility measurement using a vibrating sample magnetometer", presented at Intermag conference, 2023.


## Contact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