

## New apparatus and method for permittivity measurement

For measuring the permittivity of samples with large leaks or nano-sized samples

### Overview

Dielectric materials are used in various electronic devices. Due to the recent miniaturization of electronic devices, dielectric materials used in electronic devices tend to become smaller. Therefore, it is desirable to develop a technology that can accurately measure the permittivity of a fine capacitor structure. In addition, even in cases where the capacitor structure is not fine, **it may be difficult to determine the permittivity through impedance measurement of a capacitor structure composed of a conventional electrode pair (e.g., a diameter of 100  $\mu\text{m}$  or more) due to the existence of a region of locally high conductivity, called a leak path, in some dielectrics.**

As one method to enable measurement of the permittivity even for dielectrics having such a leak path, it may be considered that the electrode size is extremely small (For example, 1  $\mu\text{m}$  or less) and capacitance measurement is performed while avoiding the existence of the leak path. **However, when the capacitor structure becomes small, the influence of parasitic capacitance becomes relatively large, and it becomes difficult to accurately measure the capacitance of the dielectric, so that it becomes difficult to accurately measure the permittivity.** The present invention is made in view of the above problems, and relates to a method for measuring the permittivity which can accurately measure the permittivity of a small region.

### Application

- Permittivity measurement of dielectrics

### IP Data

IP No. : PCT/JP2021/043448  
Inventor : HIRANAGA Yoshiomi, ITOYA Yuki  
Admin No. : T20-3118

Please contact us for details.

### Expectation of the this invention

- **Measurement of permittivity of thin films and ceramics with large leaks**
  - ➡ Acceleration of development and evaluation of new materials
- **Direct quantitative evaluation of permittivity of nanostructures such as dielectric nanosheets**
- **Quantitative evaluation of microscopic in-plane variation of permittivity**
- **Measurement of permittivity of microwave band by relatively simple method**
  - ➡ Applicable to samples that are difficult to measure with the conventional coaxial-probe method

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