

Study on a Variable Capacitor Capable of Obtaining a Very Small Capacitance Change

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This paper describes a variable capacitor which is indispensable to high accuracy measurements of very small electrostatic capacitance change.

Recently, variable capacitors, designed for measurements of very small capacitance change, are required to have high resolving power and accuracy as well as to be built compact and easily adjusted.

But the construction of ordinary variable capacitors is too mechanical to have high resolving power.

Therefore, the author has developed a highly stabilized sensitive variable capacitor capable of obtaining a very small capacitance change.

The merit of this capacitor is that high potential electrode is constructed by the serial and parallel capacitance circuit which is mechanically assembled so that the value of capacitance change is *reduced to be extremely small without decreasing* mechanical displacement of the earth-side electrode.

Using this structure, a very small capacitance change can be measured with high degree of accuracy.

For example, in experiments, a variation of 1×10^{-6} pF was obtained by the displacement of $10 \mu\text{m}$ of the earth-side electrode.

This resolving limit is superior to all other conventional capacitors.

Moreover, it has been discussed that this capacitor also serves as an experimental tool to measure dielectric property of thin films.

In experiments, dielectric constant and thickness of Langmuir films have been measured.

From the result of measurement, it is concluded that this capacitor is suitable especially for dielectric thin films that are difficult to measure by conventional capacitors.