

**[V-03]**

## **Vacuum gauge of a thermal conduction type utilizing the Peltier effect**

Y. J. Yun, C. D. Park\*, D. H. Jung\*\*

Department of physics Kyungpook National University,

\*Pohang Accelerator Laboratory, \*\*POTHVAC(Postech Thermal and Vacuum Systems) inc.

The junction of a thermocouple, conventionally used as a temperature sensor, can work as a point heat source or sink if an electric current flows. This characteristic is well known as the Peltier effect. Utilizing the Peltier effect, we have developed a new type vacuum gauge, Peltier vacuum gauge(PVG). PVG is based on thermal conduction by gases, and consists of a single thermocouple that plays roles of a heater and a sensor simultaneously. PVG shows the sensitivity similar or better than that of a Pirani or thermocouple gauge in the range between  $10^{-4}$  Torr and atmospheric pressure. However, what distinguish PVG from these gauges are: (1)its simple structure offers a way to miniaturization of a vacuum sensor(length 5 mm, diameter 12.5  $\mu$ m)appropriate for a local and fast probe as the pressure changes, (2)it operates at a few degrees above the wall temperature with high sensitivity, (3)it has appreciable sensitivity even above 10 Torr due to the fact that the electronics measure not only the thermal conductivity, but also the heat capacity of gaseous molecules which is proportional to pressure by driving the sensor in ac-mode.