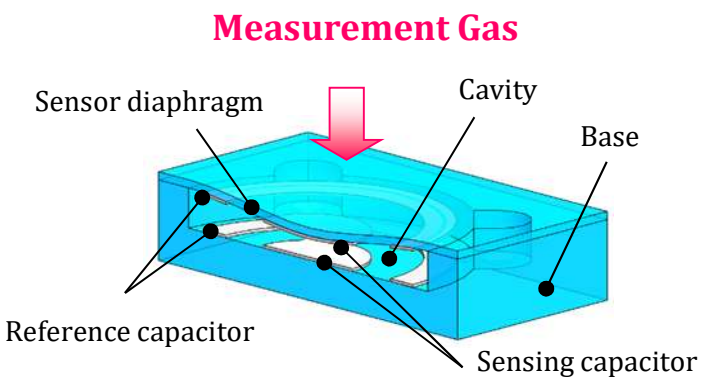


Fig.1 Schematic cross-sectional view of sapphire-based capacitive pressure sensor chip

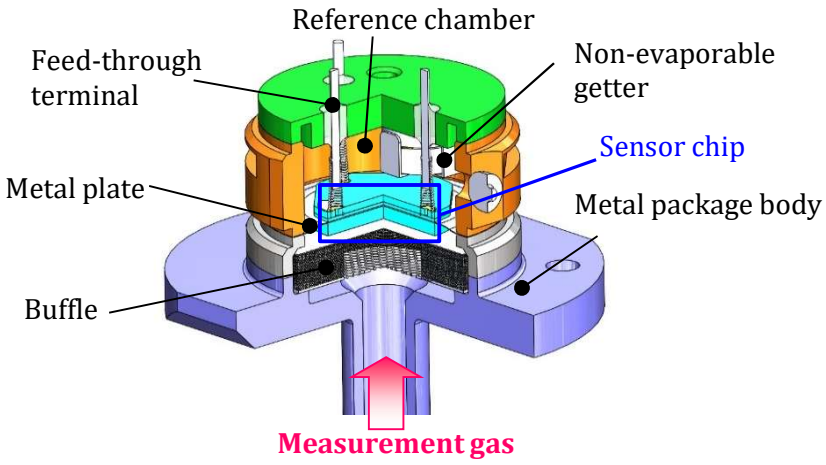


Fig.2 Schematic cross-sectional view of sapphire-based capacitance manometer

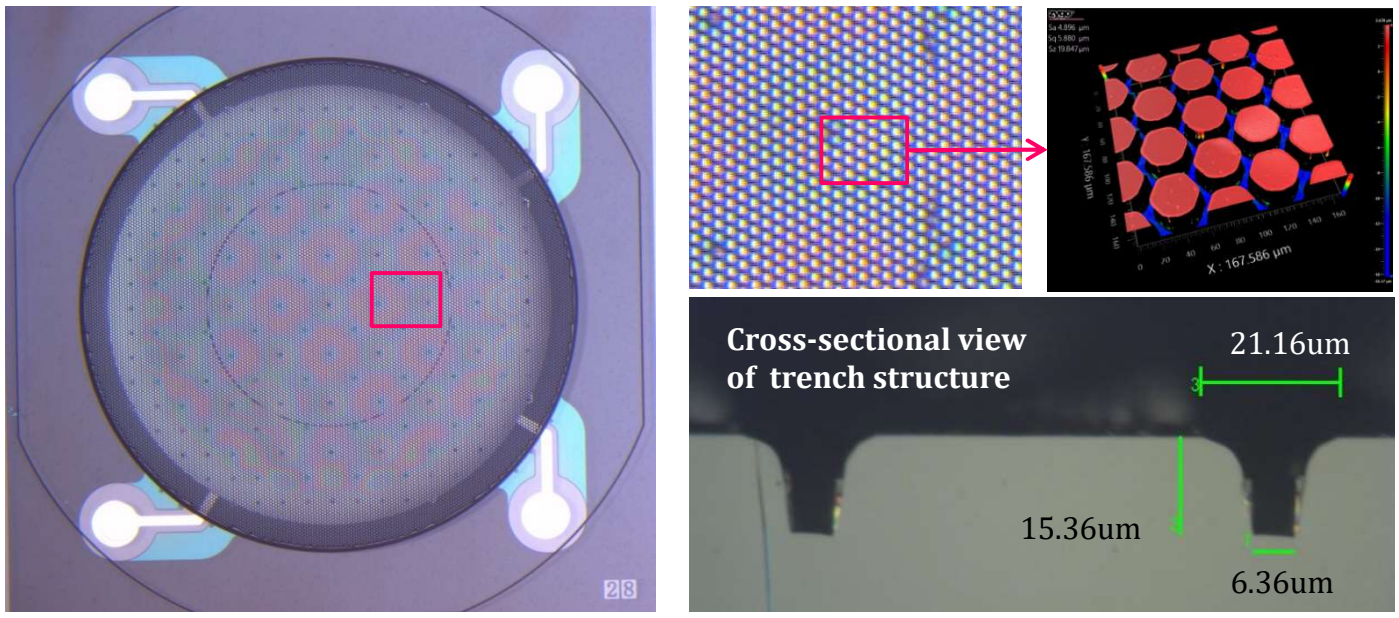
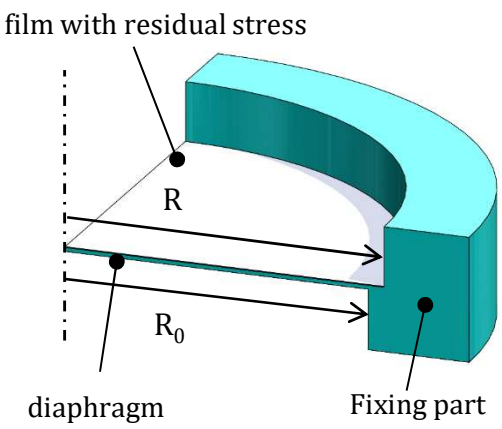


Fig.3 Fine trench structure of the sensor diaphragm surface
Fine trench structure with about15um-depth and 6um-width was fabricated on the sensor diaphragm surface using the sapphire-MEMS technology



Mechanical simulation model

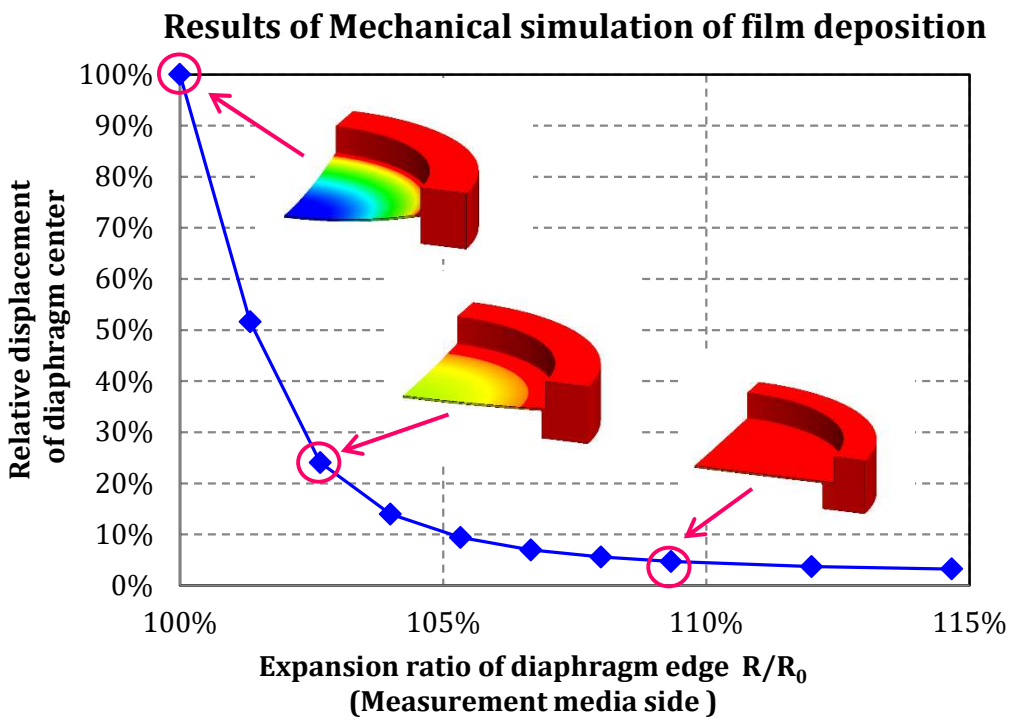


Fig.4 Mechanical simulation of film deposition
In this simulation, we assumed films with residual stress deposited on the diaphragm surface and calculated the diaphragm displacements. It is indicated that diaphragm displacements caused by film deposition could be supressed by expanding diaphragm edge of measurement media side.

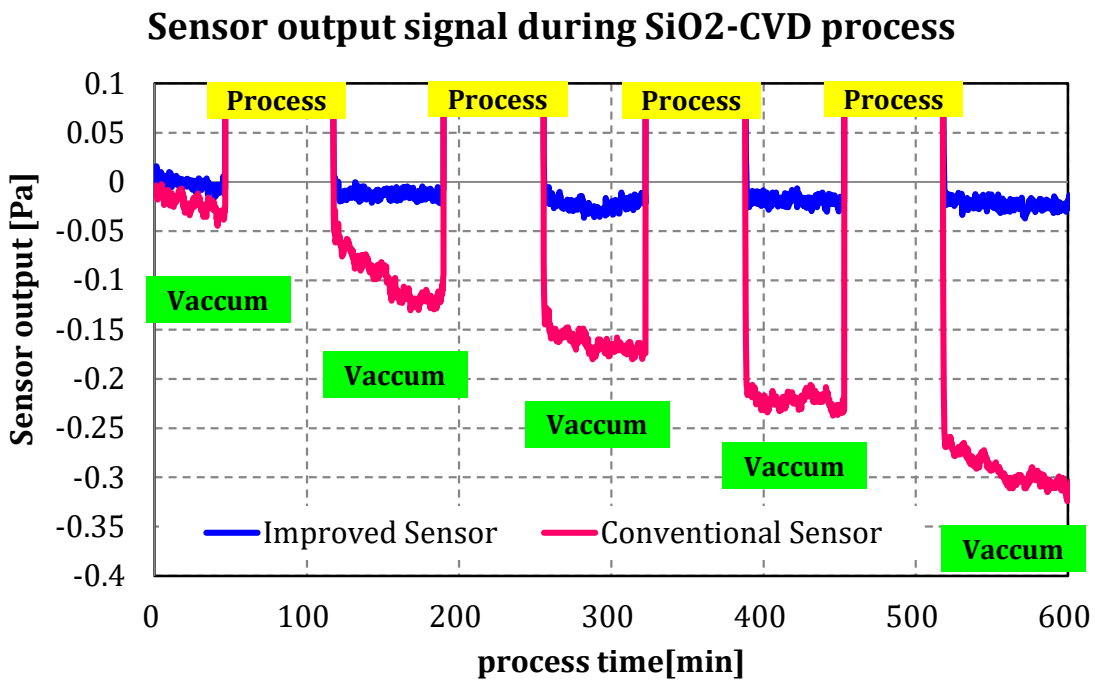


Fig.5 Sensor output signal during SiO2-CVD process
Pressure range of these manometers are 0-1333Pa and operating at 150C.Though conventional sensor caused zero-point shift about -0.3Pa, improved one is only -0.025Pa after process.

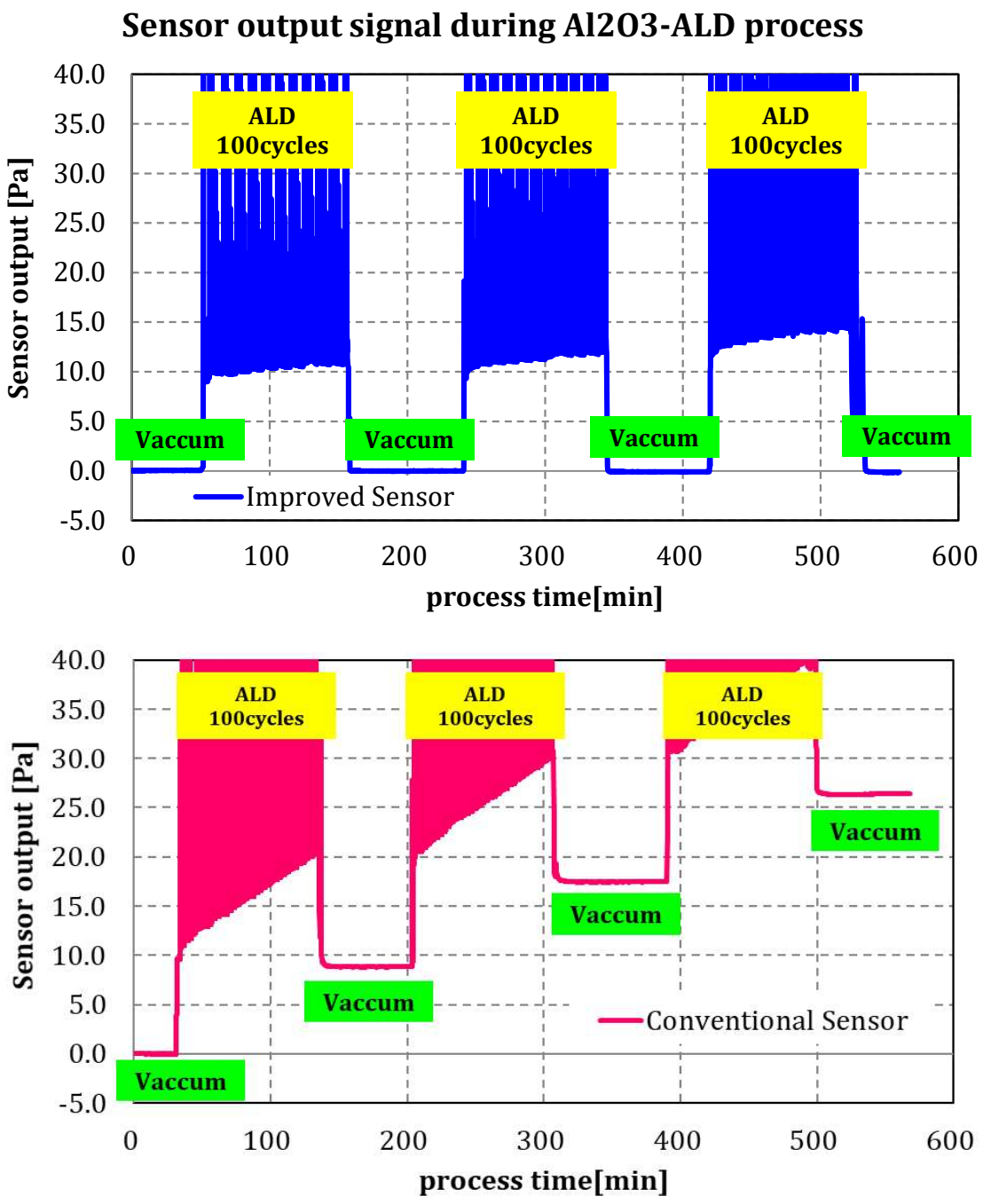


Fig.6 Sensor output signal during Al2O3-ALD process
Pressure range of these manometers are 0-1333Pa and operating at 150C. After process, zero-point shift of improved sensor is -0.1Pa and that of conventional sensor is +26.4Pa, respectively. Effectiveness of improvements is much obvious than CVD-process in Fig.5.