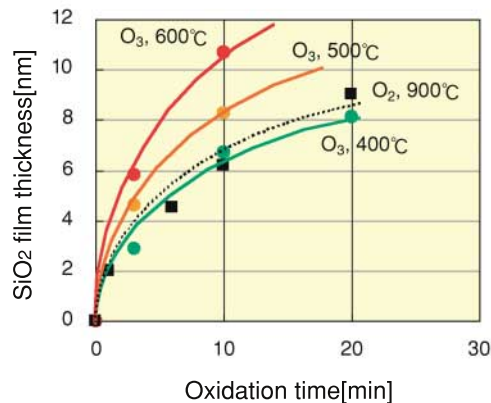


# Low Temperature Device-Quality SiO<sub>2</sub> Film Fabrication Process

## - Development of 400°C Fabrication Process using Highly-Concentrated Ozone -

100 % ozone oxidation process has been applied for the first time to low-temperature oxidation of silicon to fabricate device quality SiO<sub>2</sub> films. A new quartz cold wall-type furnace equipped with a halogen lamp heater was built for efficient oxidation by 100 % ozone gas supplied from the lab-developed highly-concentrated ozone generator. As shown in the figure, the ozone-oxidized SiO<sub>2</sub> film growth rate at 400 °C was as large as that of the conventional thermal oxidation at 900°C. The electrical properties of the ozone-oxidized SiO<sub>2</sub> films show that the films are of the device grade.



Comparison of the oxide film growth rates between ozone oxidation and thermal oxidation: The ozone oxidation at 400°C shows a nearly equal growth rate to the thermal oxidation at 900°C. (the value from a literature)

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# Design of Smart Structure

## - Stable Control of Tower Structure Using Distributed Sensor/Actuator -

When some stimulus exist, nerve of living things catches them as information and muscle responds immediately to lead living things in security. Our research has an object to make structure as simulated living things; in other terms, make a smart structure which includes sensor and actuator corresponding to nerve and muscle, respectively.

Until today, vibration information had been taken by a sensor which can collect only from specific point. Control by using point information sensor has problems, such as problem on distinguish vibration modes or problem on amount of information, so that there remind some difficulties on construction of control system.

The subject here is to realize a stable control system by using smart sensor and actuator (actuation system). First, let a sensor itself sort out factors which harm structures, using 2D sensor made of PVDF film. Second, at the same time, generate distributed actuation system without causing in-

stable phenomenon of structure. Smart structure with higher safeness for structure is on development by realizing the series of movements above-mentioned.



Experimental set up of smart tower structure

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