

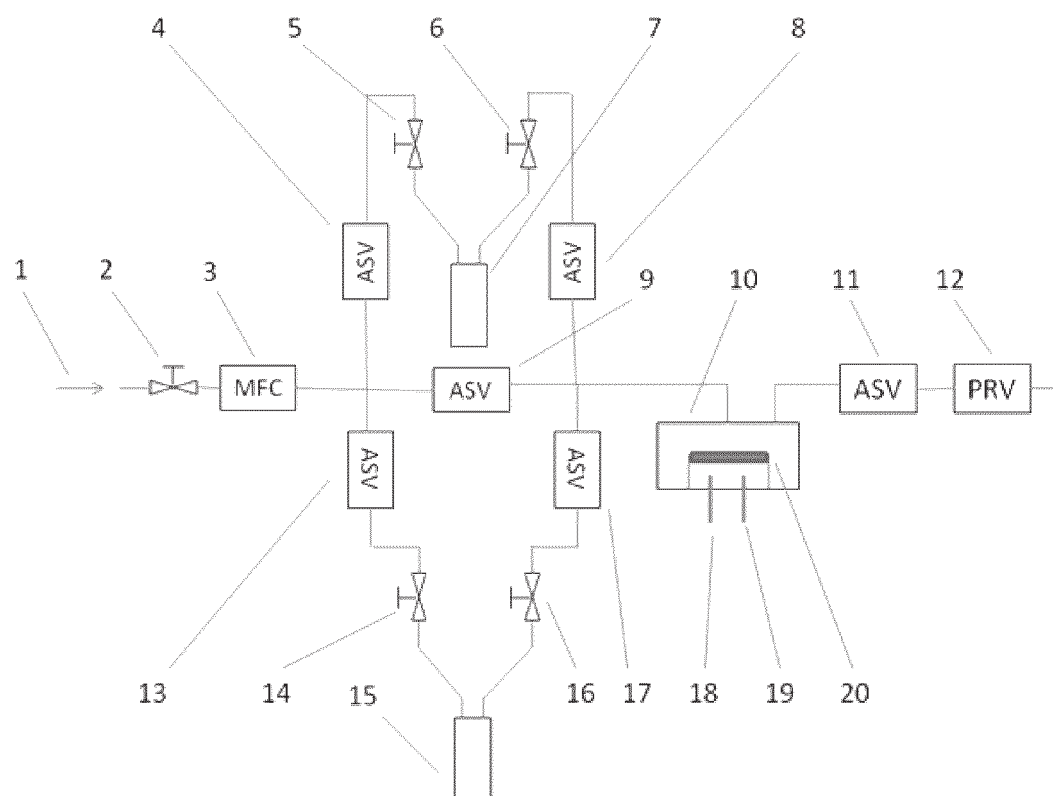


Figure 1 . Sketch of ALD system for thin film deposition.

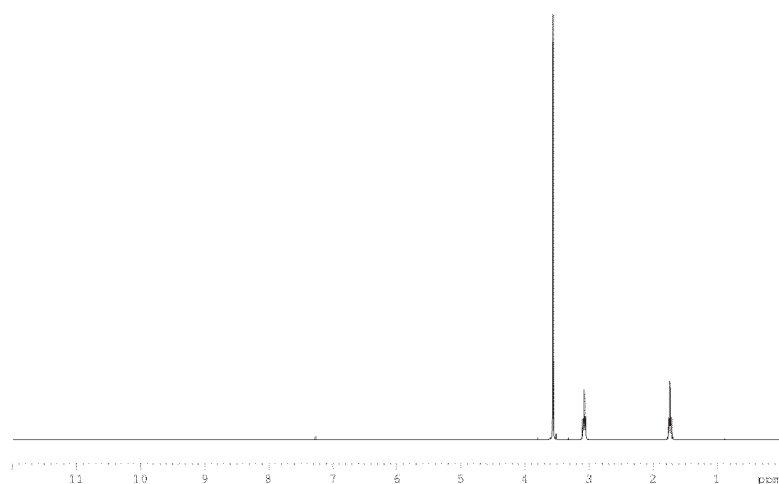


Figure 2 . NMR spectrum of (pyrro)Si(OMe)₃

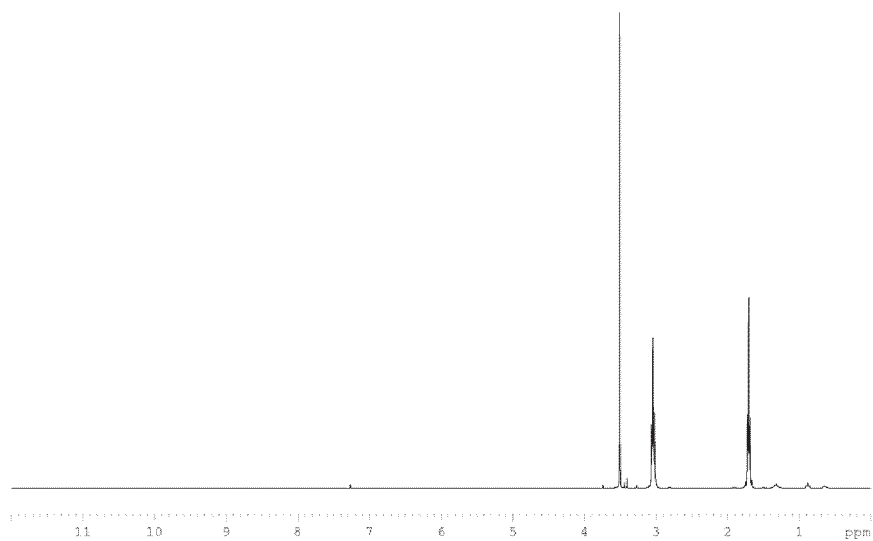


Figure 3. NMR spectrum of $(\text{pyrro})_2\text{Si}(\text{OMe})_2$

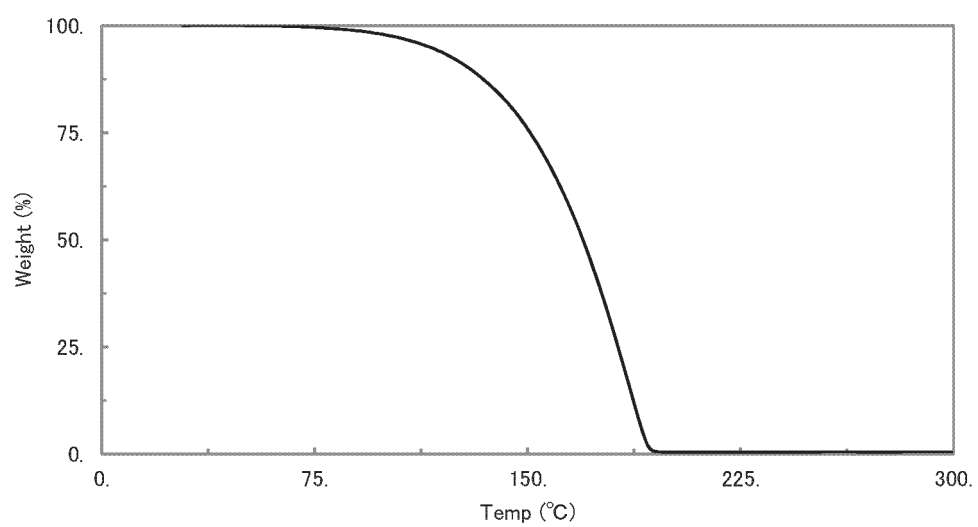


Figure 4. TGA of $(\text{pyrro})_2\text{Si}(\text{OMe})_2$

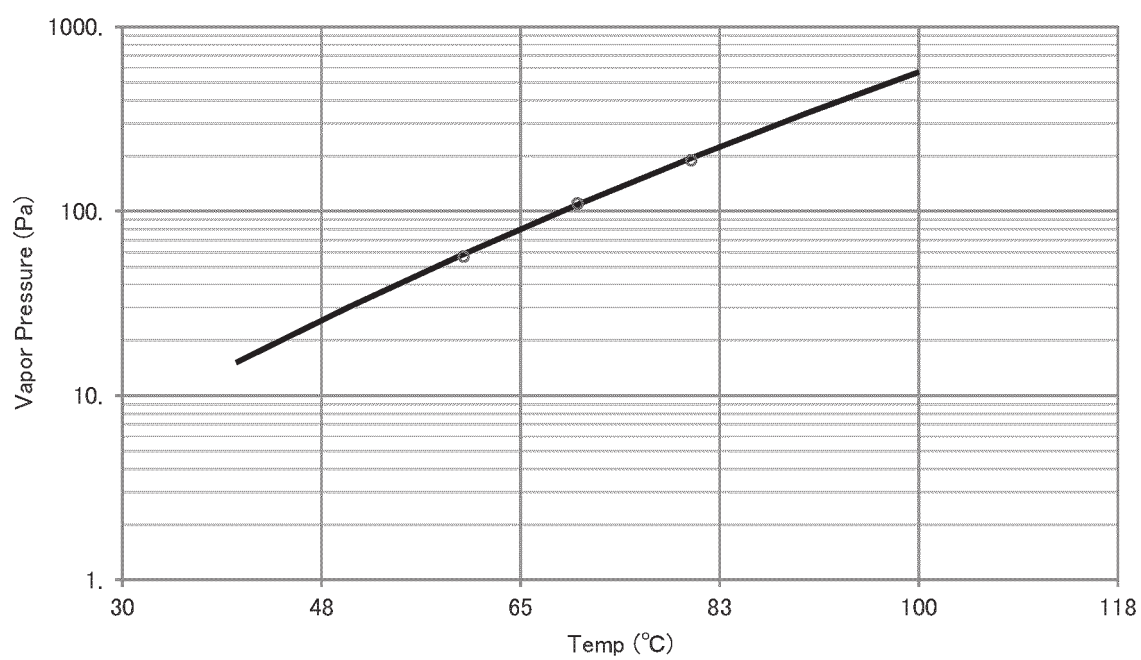


Figure 5. Vapour pressure of $(\text{pyrro})_2\text{Si}(\text{OMe})_2$

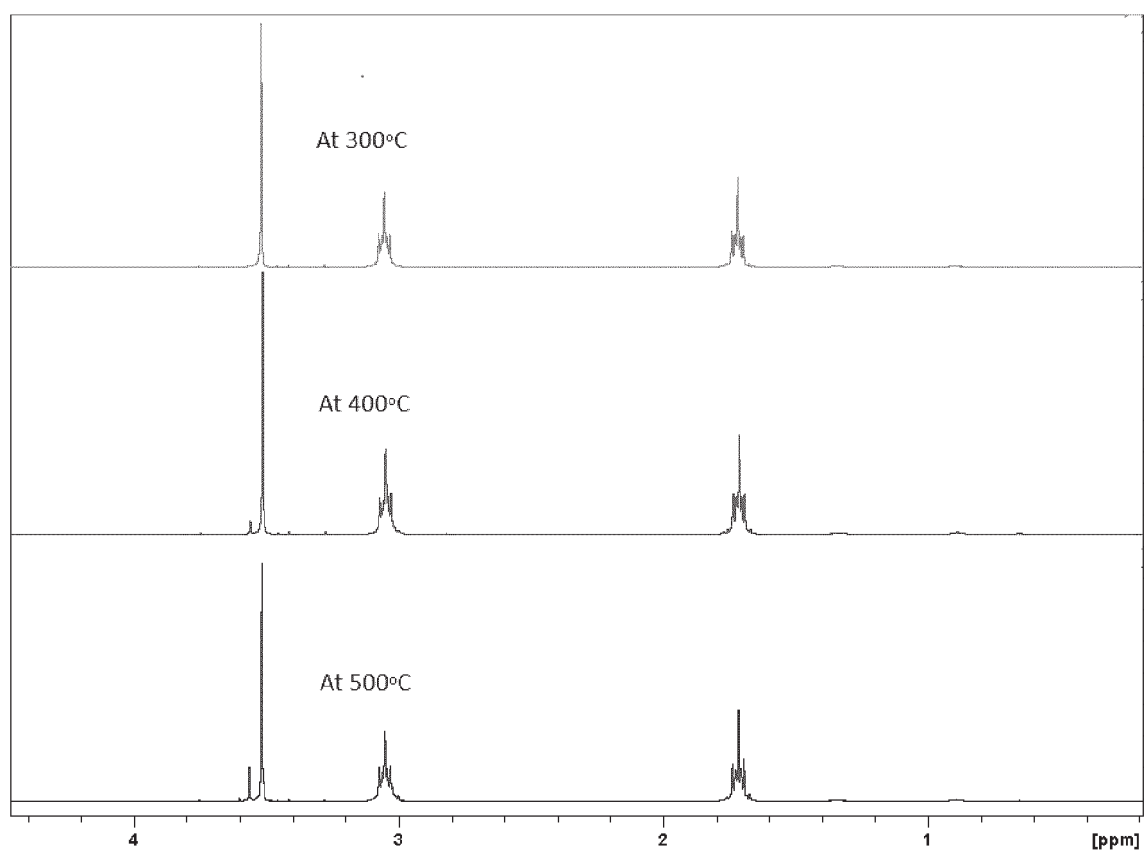


Figure 6. NMR spectra of thermally treated $(\text{pyrro})_2\text{Si}(\text{OMe})_2$

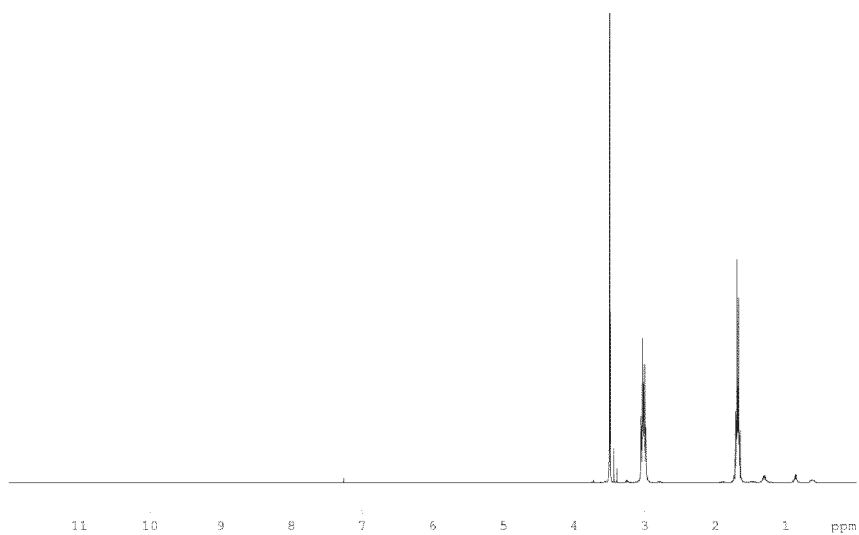


Figure 7. NMR spectrum of (pyrro)₃Si(OMe)

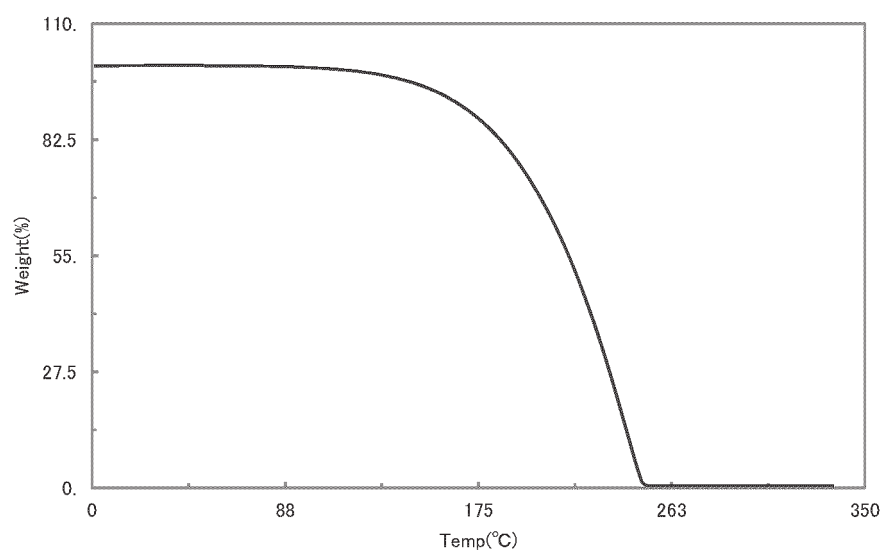


Figure 8. TGA of (pyrro)₃Si(OMe)

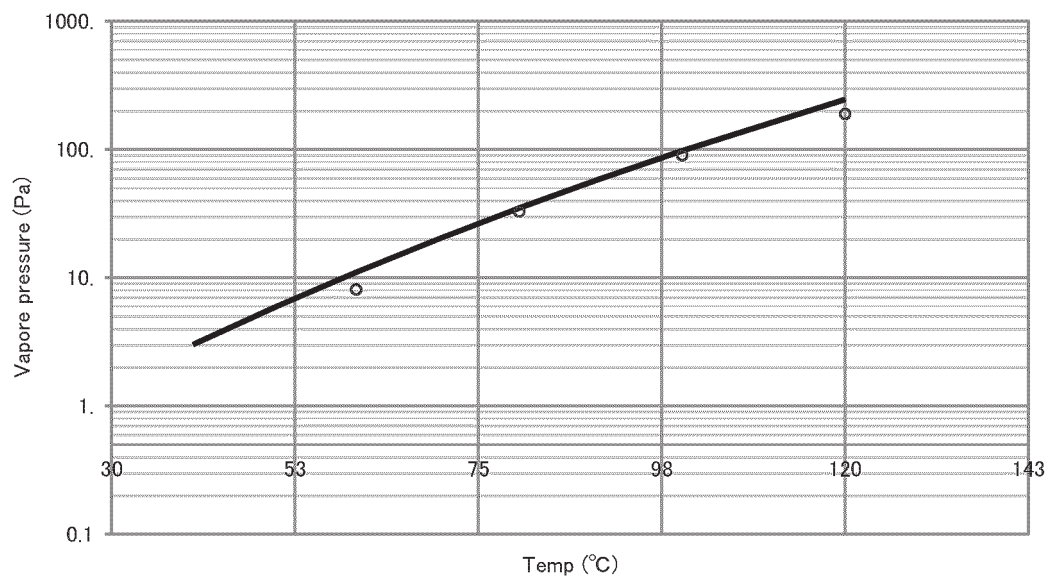


Figure 9. Vapour pressure of $(\text{pyrro})_3\text{Si}(\text{OMe})$

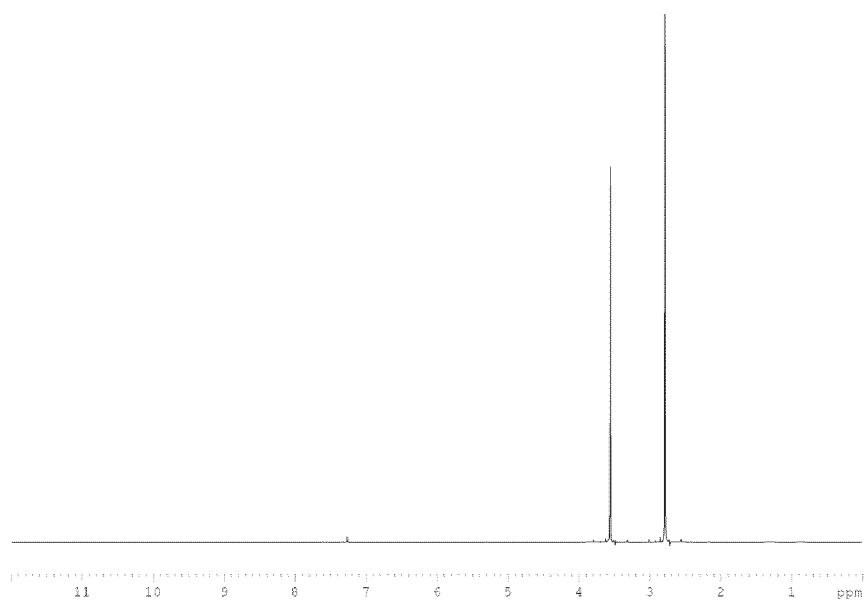


Figure 10. NMR spectrum of $(\text{TetramethylguanidinyI})\text{Si}(\text{OMe})_3$

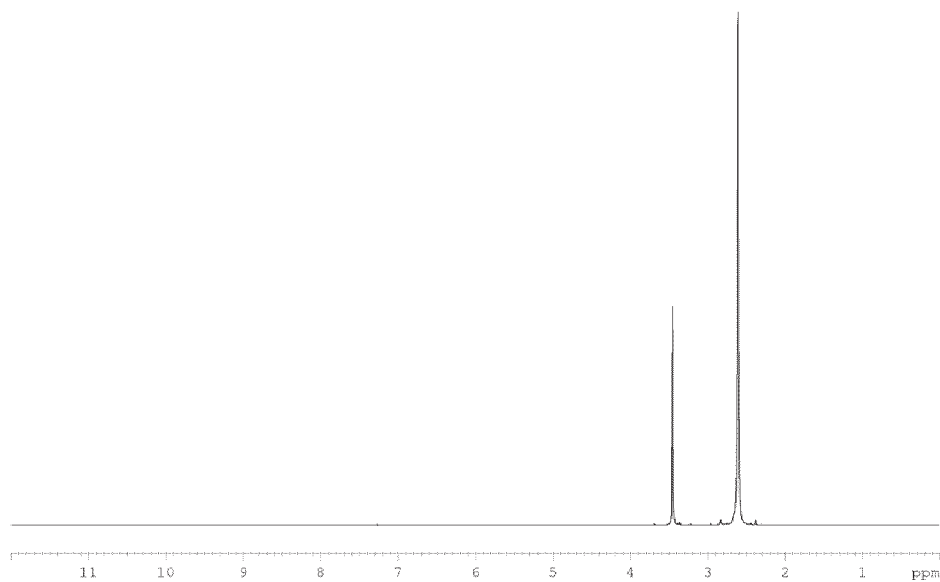


Figure 11. NMR spectrum of (Tetramethylguanidiny1)₂Si(OMe)₂

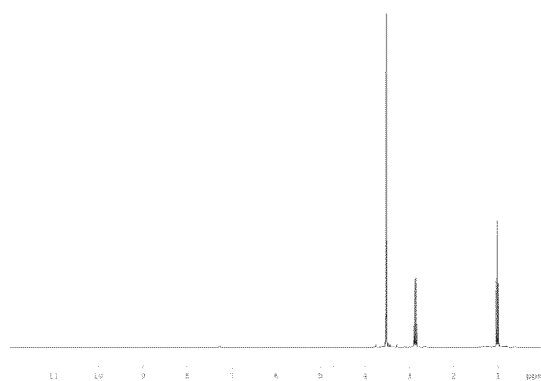


Figure 12. NMR spectrum of (Et₂N)Si(OMe)₃

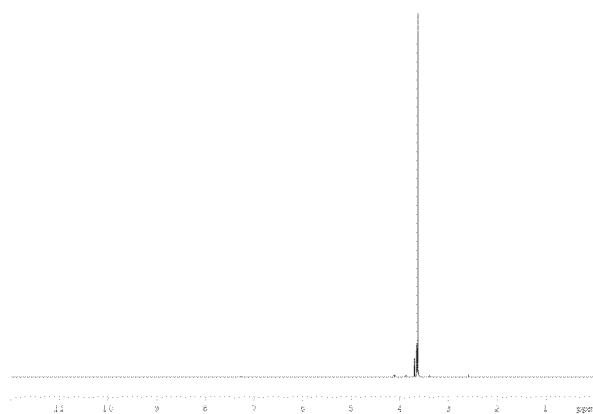


Figure 13. NMR spectrum of ClSi(OMe)_3

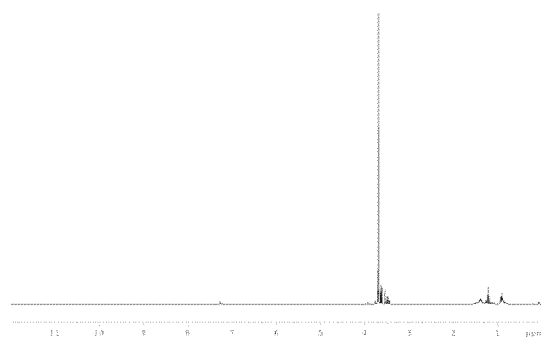


Figure 14. NMR spectrum of $\text{Cl}_2\text{Si(OMe)}_2$

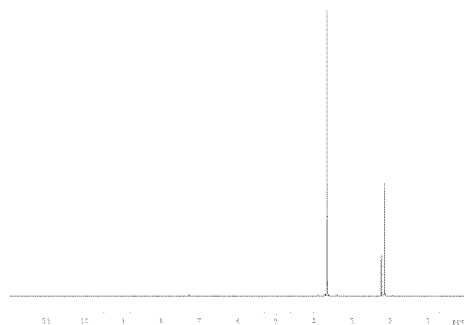


Figure 15. NMR spectrum of (AcO)Si(OMe)₃

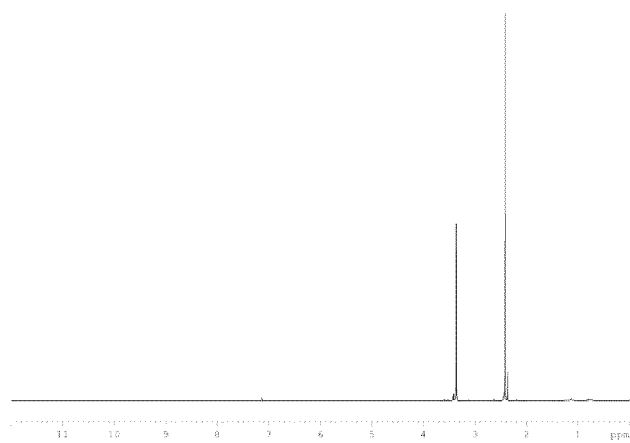


Figure 16. NMR spectrum of (Me₂N)₂Si(OMe)₂

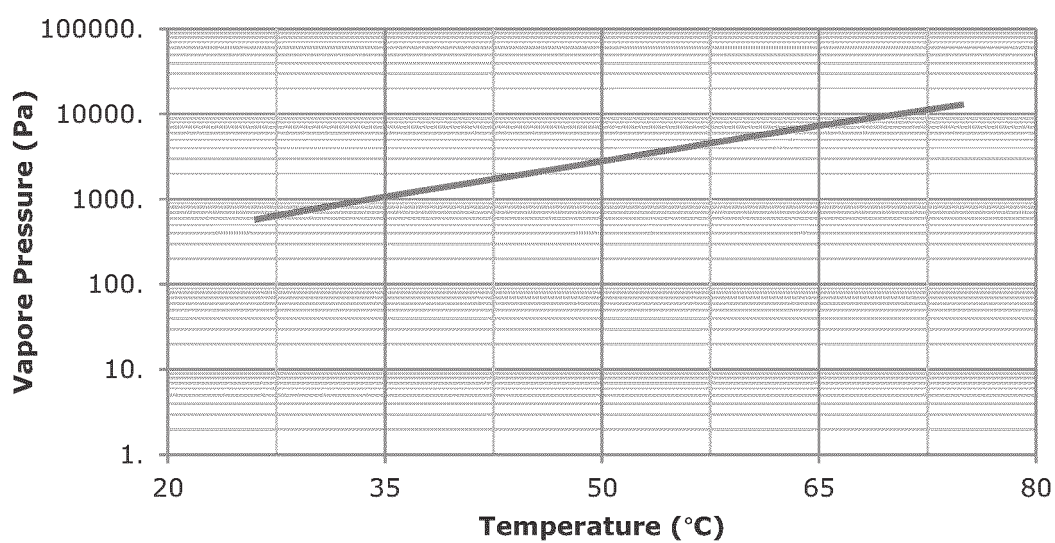


Figure 17. Vapour pressure of $(\text{Me}_2\text{N})_2\text{Si}(\text{OMe})_2$

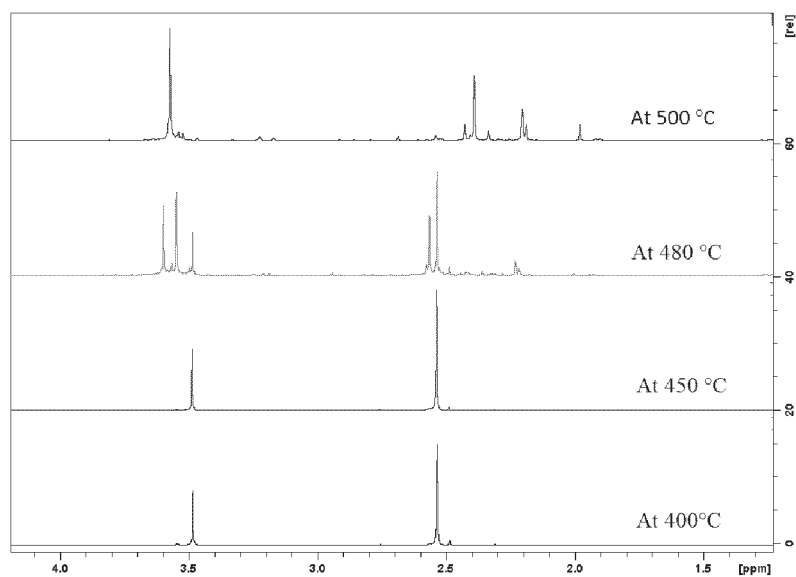


Figure 18. NMR spectra of thermally treated $(\text{Me}_2\text{N})_2\text{Si}(\text{OMe})_2$

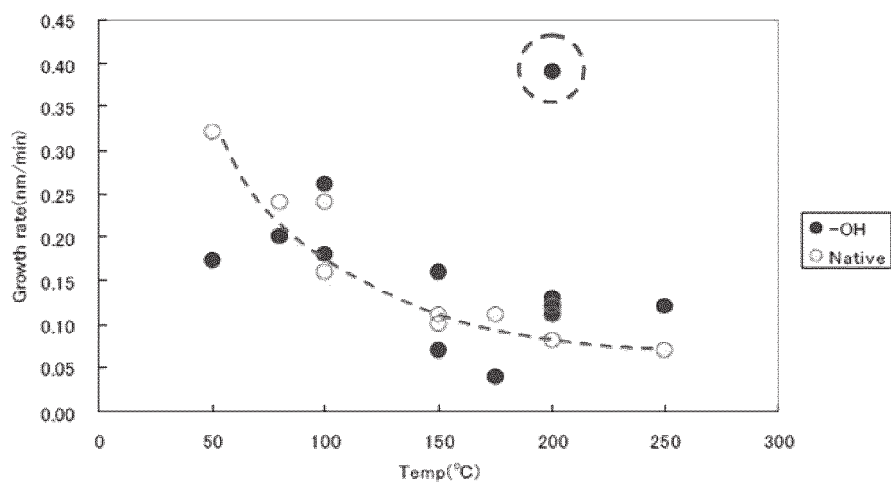


Figure 19. CVD growth rate vs. temperature of of SiO₂ using (pyrrolidine)₂Si(OMe)₂ and H₂O at 80 Torr.

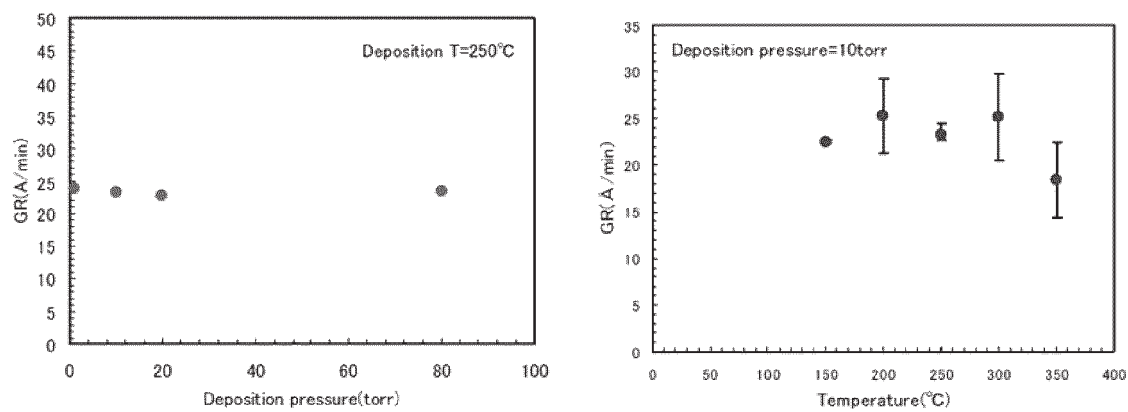


Figure 20. CVD growth rate vs. temperature and pressure of of SiO₂ using (pyrrolidine)₂Si(OMe)₂ and O₃

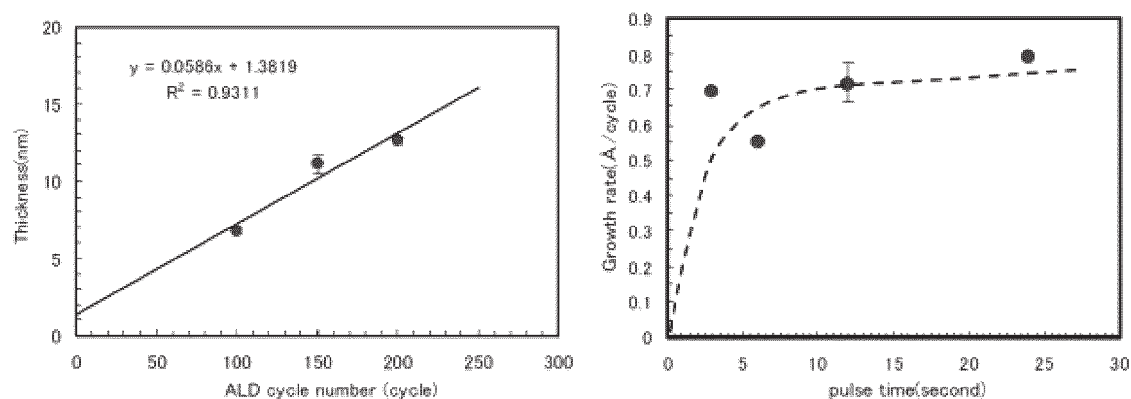


Figure 21. ALD of SiO₂ using (pyrrolidine)₂Si(OMe)₂ and O₃ carried out showing linear film thickness with number of ALD cycles and flattening of the growth rate with (pyrrolidine)₂Si(OMe)₂ pulse time

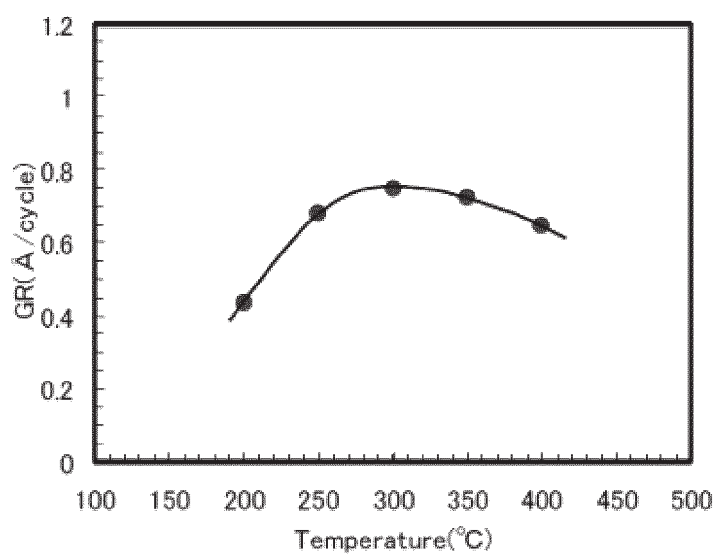


Figure 22. ALD of SiO₂ using (pyrrolidine)₂Si(OMe)₂ and O₃ carried out, showing the temperature effect on the growth rate, suggesting best ALD window is 250-400°C

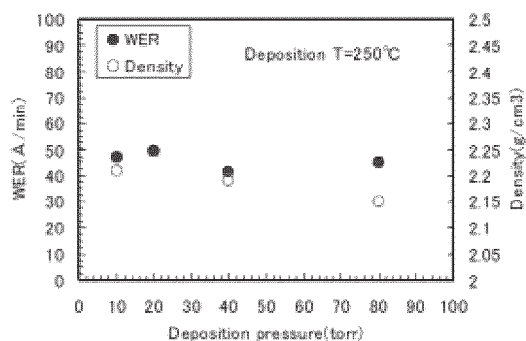


Figure 23. Wet etching rate of SiO₂ films in dilute HF acid (0.1%), films prepared by CVD at 250°C and various pressures using (pyrrolidine)₂Si(OMe)₂ and O₃

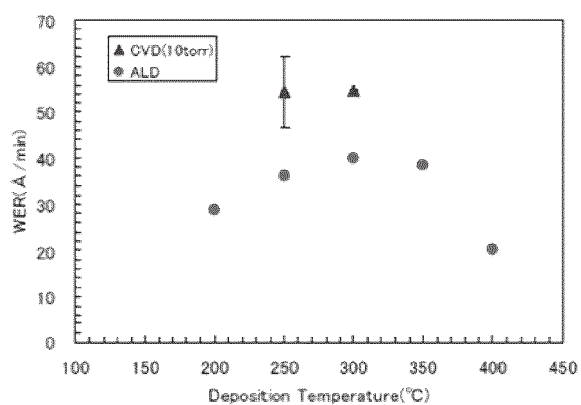


Figure 24. Wet etching rate of SiO₂ films in dilute HF acid (0.1%), films prepared by CVD and ALD at various temperatures using (pyrrolidine)₂Si(OMe)₂ and O₃

Precursor	Oxidant	Deposition Temperature	Growth Rate (Å/cycle)	Wet Etch Rate (Å/minutes in 0.5% HF)
Tris(dimethylamino) silane – 3DMAS	Ozone (O ₃)	350 °C	0.9	300
Bis(diethylamino) silane – BDEAS	Ozone (O ₃)	350 °C	1.2	300
Amino Silane A	Ozone (O ₃)	350 °C	1.8	300
(pyrrolodiny1) ₂ Si(OMe) ₂ Example 2	Ozone (O ₃)	350 °C	0.7	200

Figure 25. Table showing the wet etching rate comparison of the new material with commercially available material used to carry out deposition of silicon oxide films using the same conditions