■ Development Project of "New Nb Precursors" Ver.2

□ Target : NbOx & NbNx

Code Name	TCNb-11
1) $TGA_{1/2}$ (℃)	155
Residual mass (%)	< 1%
2) DSC (℃)	306

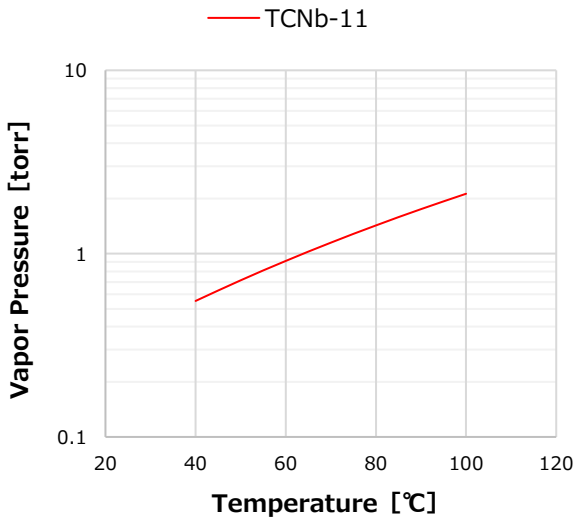
＊ Target Precursor is NbCl5.

1) TGA (Thermogravimetric Analysis) : Volatility property of precursor

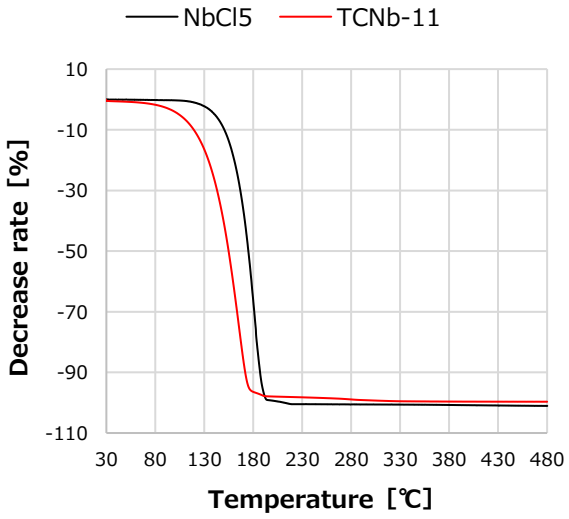
- **$TGA_{1/2}$ (℃)** : Temperature at 50% vaporization (low temperature → high volatility)
- **Residual mass (%)** : Residue mass after vaporization (low value → good thermal stability)

2) DSC (Differential Scanning Calorimetry)
: Decomposition temperature of precursor

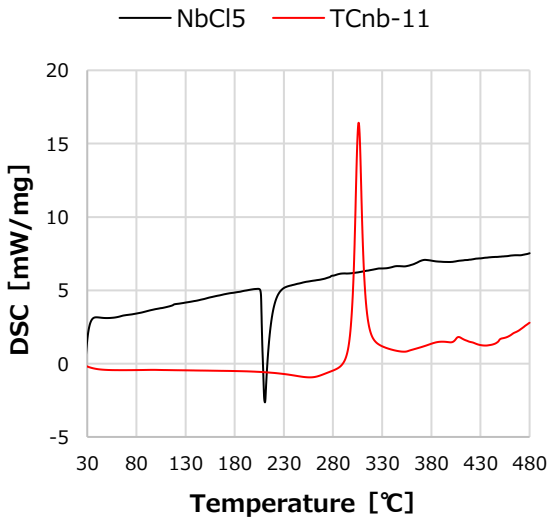
■ Vapor Pressure curve



■ TGA curve



■ DSC curve



■ Development Project of "New Nb Precursors" Ver.2

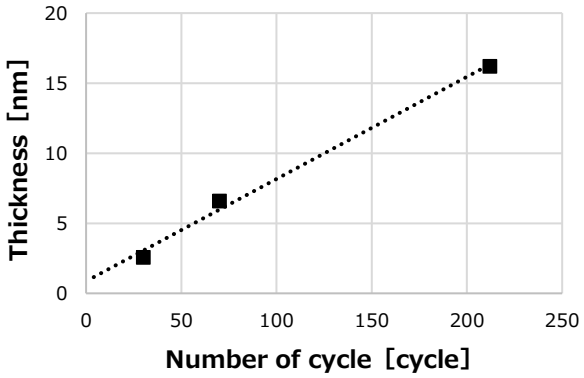
□ ALD evaluation ～ Watty Co. ～

Precursor	TCNb-11
reactant	H2O
substrate	Si
Remark	NbOx

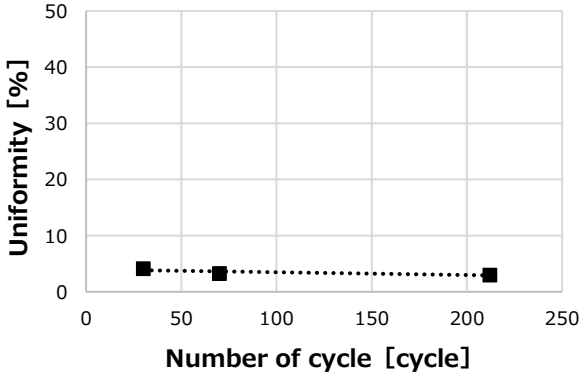
Watom-2T
(Thermal ALD)

[ALD cycle test Ⅰ]

■ Incubation cycle

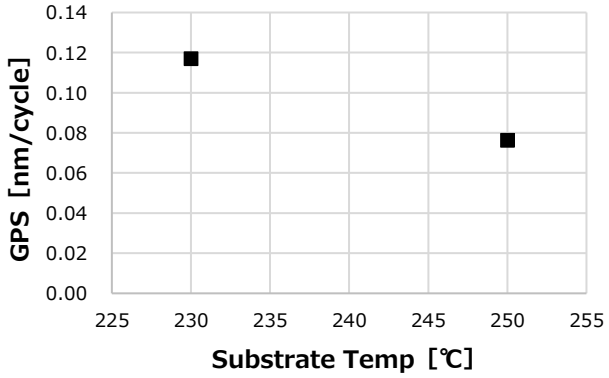


■ Thickness Uniformity

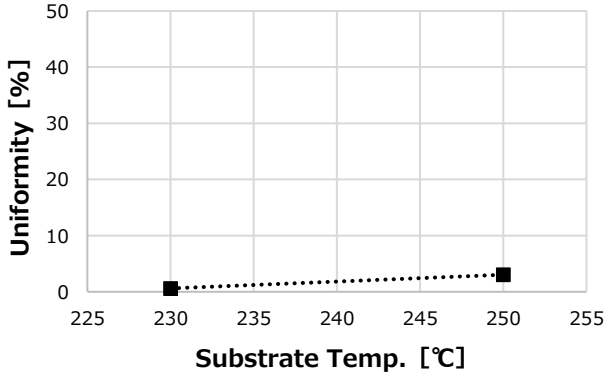


[ALD cycle test Ⅱ]

■ ALD window



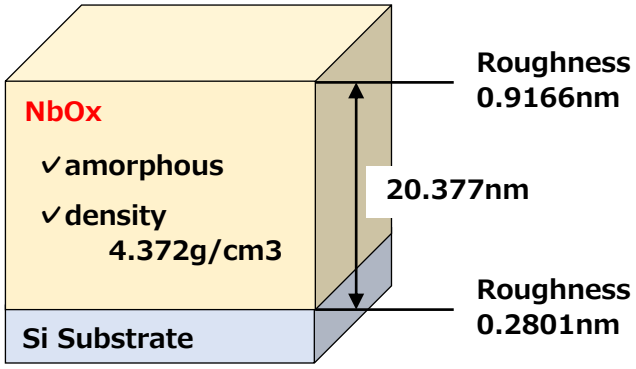
■ Thickness Uniformity



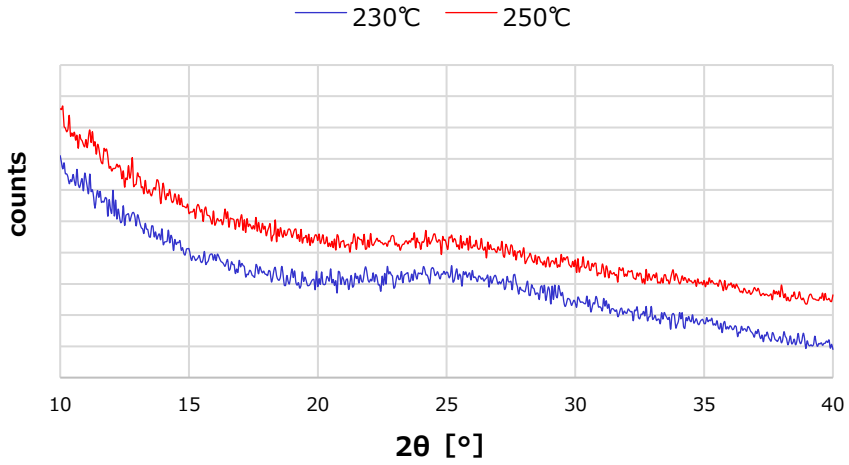
■ Development Project of "New Nb Precursors" Ver.2

□ X-ray analysis（I） ～ YOKOHAMA National University ～

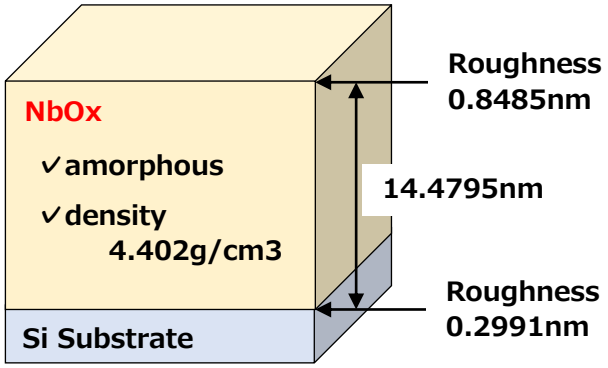
■ Deposition Temp. @230℃



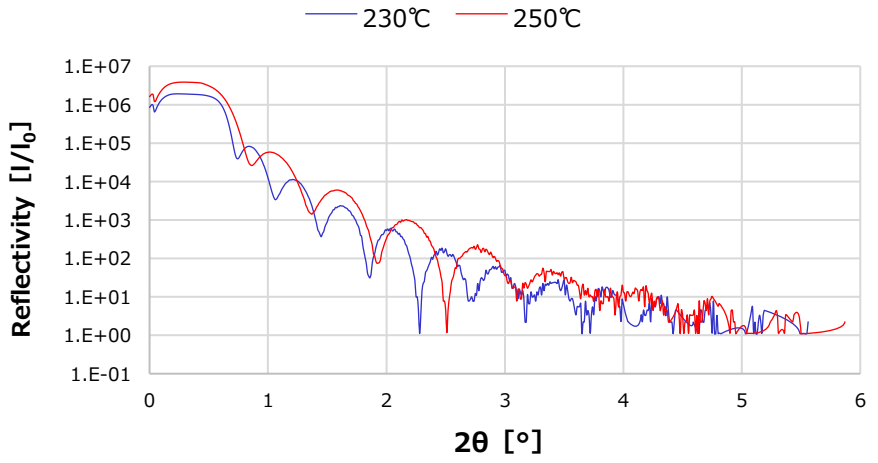
[GIXRD Chart]



■ Deposition Temp. @250℃



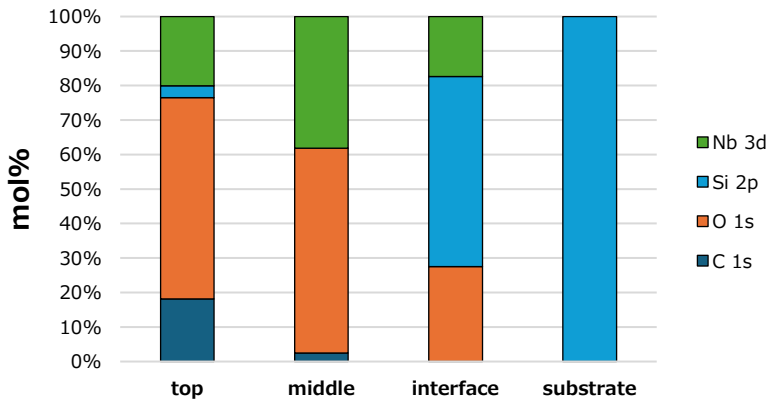
[XRR Chart]



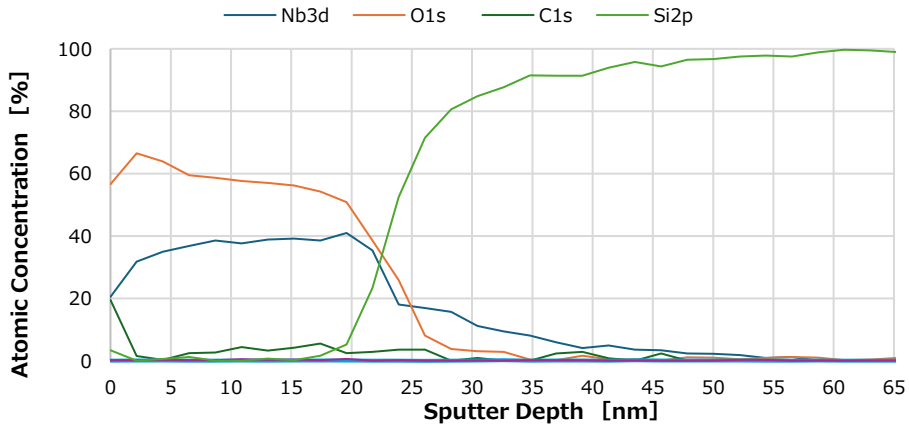
■ Development Project of "New Nb Precursors" Ver.2

□ X-ray analysis（Ⅱ） ～ YOKOHAMA National University ～

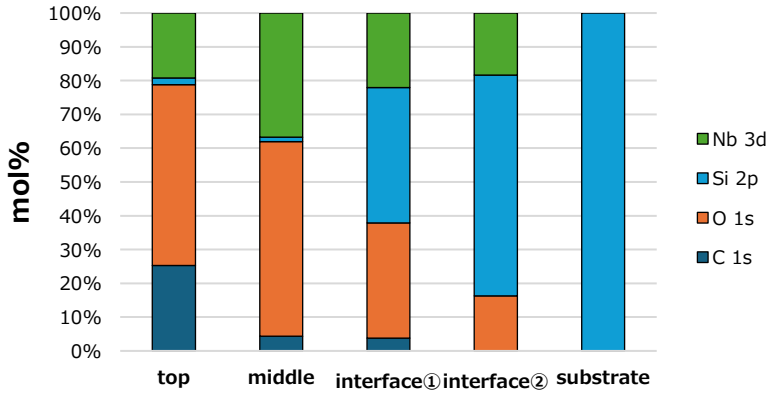
■ Deposition Temp. @230℃



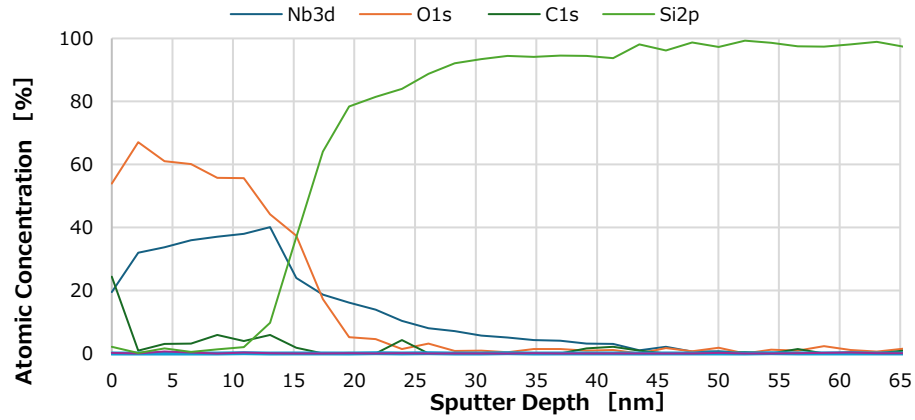
[XPS Depth File]



■ Deposition Temp. @250℃



[XPS Depth File]



! Halogen elements were below the lower limit of quantification.