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Supporting Information

Engineering of Large Third-Order Nonlinearities in Atomic Layer Deposition Grown TiO_2 Films Having Ti-O-N Metallic Bonds

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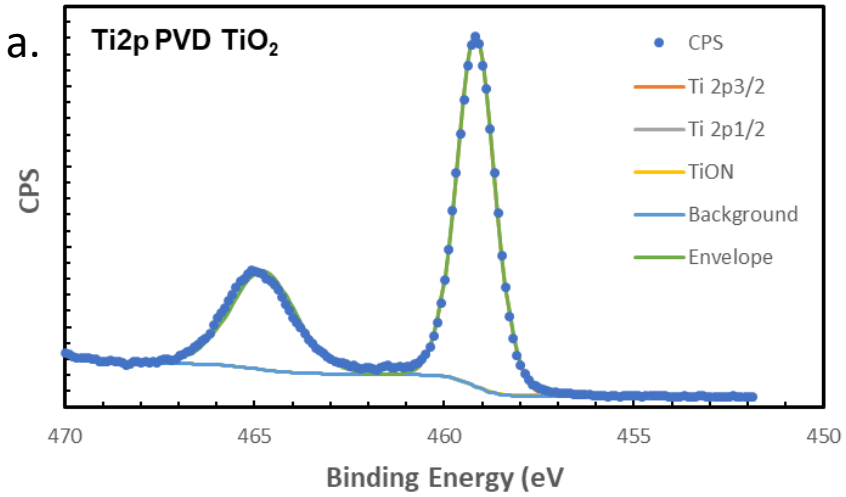
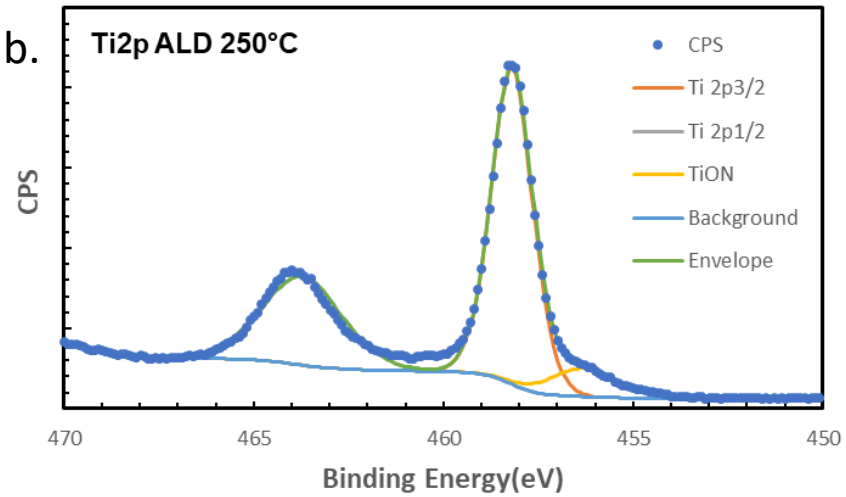
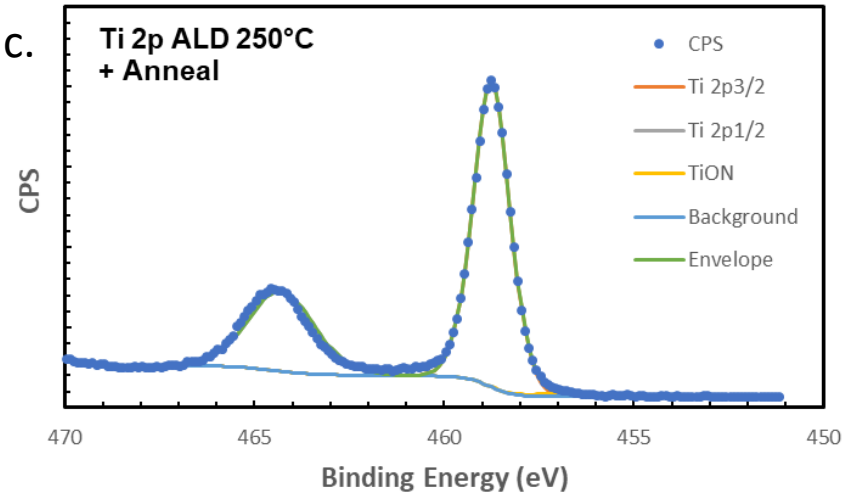
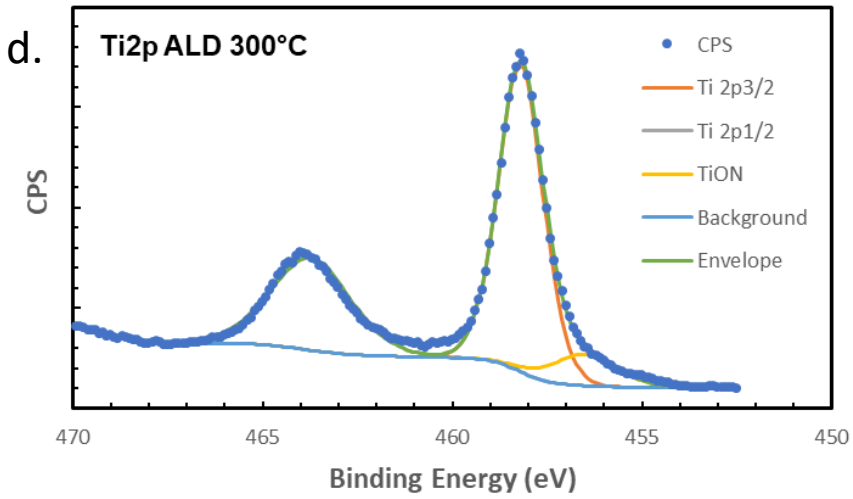

a.
Ti2p PVD TiO2
CPS
Ti 2p3/2
Ti 2p1/2
TiON
Background
Envelope
CPS
470
465
460
455
450
Binding Energy (eV


b.
Ti2p ALD 250°C
CPS
Ti 2p3/2
Ti 2p1/2
TiON
Background
Envelope
CPS
470
465
460
455
450
Binding Energy(eV)


c.
Ti 2p ALD 250°C
+ Anneal
CPS
Ti 2p3/2
Ti 2p1/2
TiON
Background
Envelope
CPS
470
465
460
455
450
Binding Energy (eV)



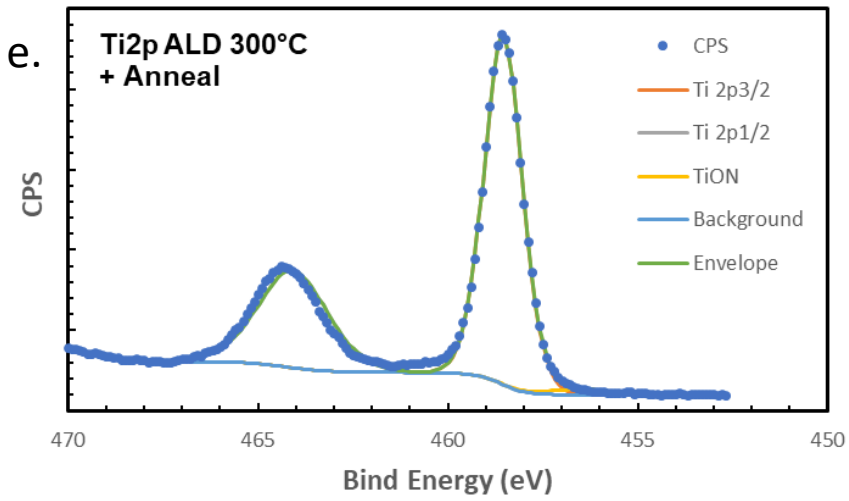
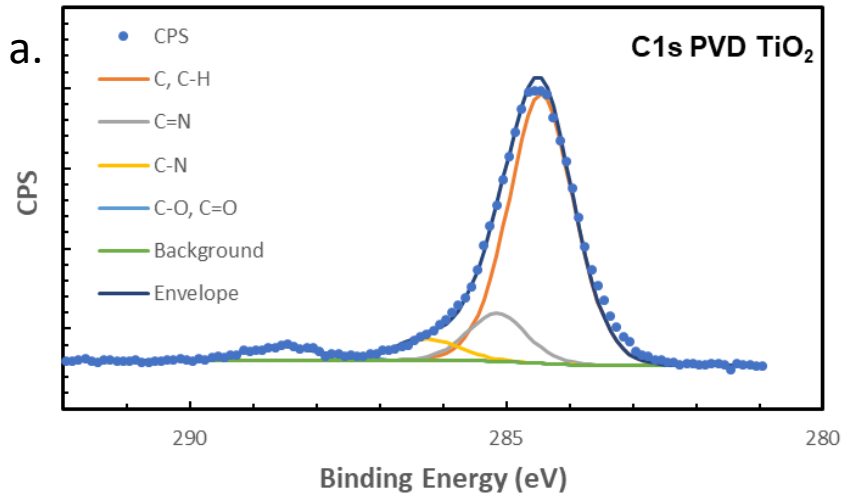
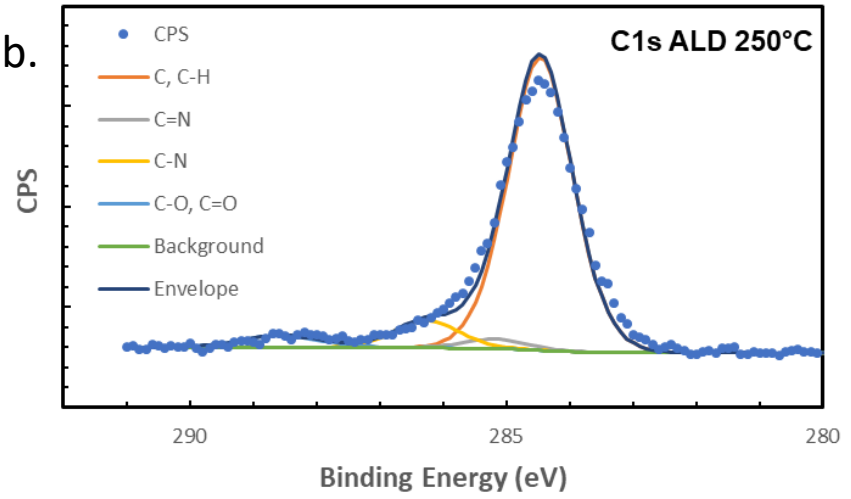
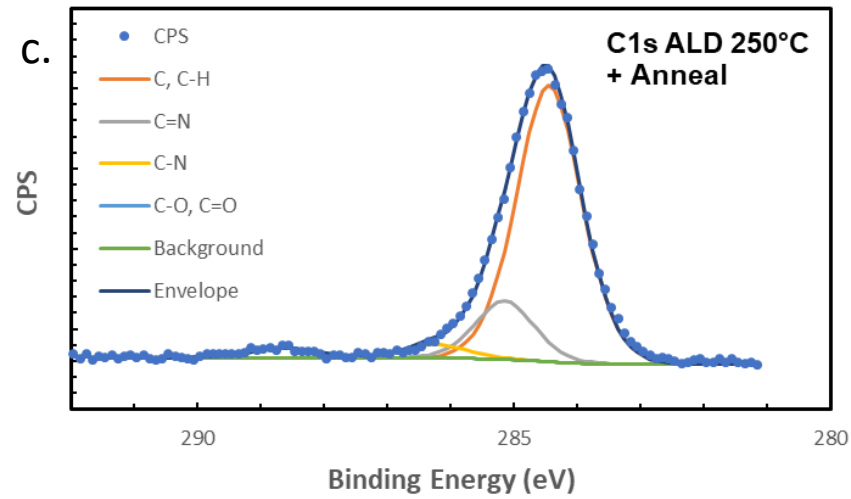


Figure S1. Sample Ti 2p high-resolution XPS scans and associated fits**.**


a.
CPS
C, C-H
C=N
C-N
C-O, C=O
Background
Envelope
C1s PVD TiO2
CPS
290
285
280
Binding Energy (eV)


b.
CPS
C, C-H
C=N
C-N
C-O, C=O
Background
Envelope
C1s ALD 250°C
CPS
290
285
280
Binding Energy (eV)


c.
CPS
C, C-H
C=N
C-N
C-O, C=O
Background
Envelope
C1s ALD 250°C
+ Anneal
CPS
290
285
280
Binding Energy (eV)

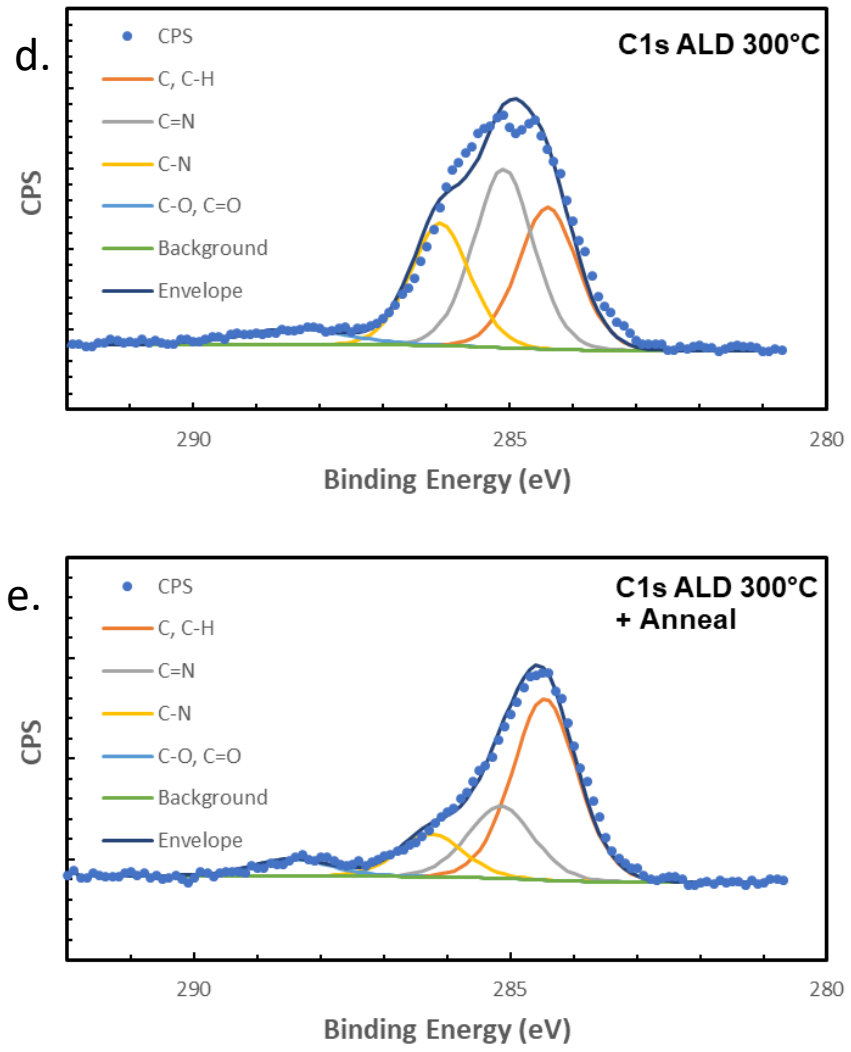


Figure S2. Sample C 1s high-resolution XPS scans and associated fits**.**

CS_2 Calibration Measurement Results

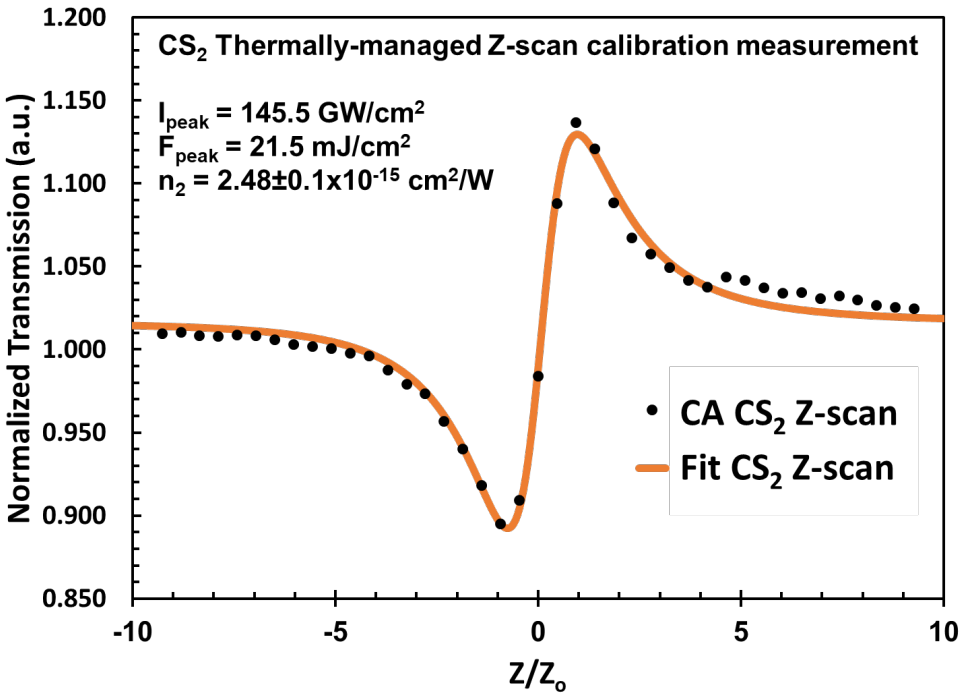


Figure S3. Calibration Z-scan measurement with CS_2. The result shows a measured n_2 of 2.48± x10^{-15} cm^2/W which is close to the excepted value of 2.4x10^{-15} cm^2/W.