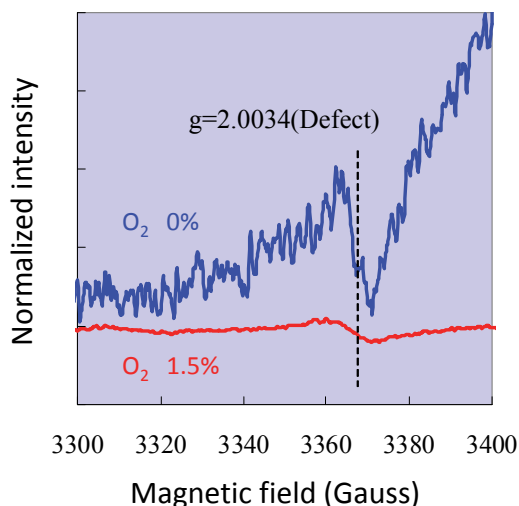


Structural analysis of TAOS by various spectroscopy

Defects and coordination structure of the transparent amorphous oxide semiconductor typified by a-IGZO (TAOS), can be analyzed in detail by ESR, solid-state NMR, Raman and CL.

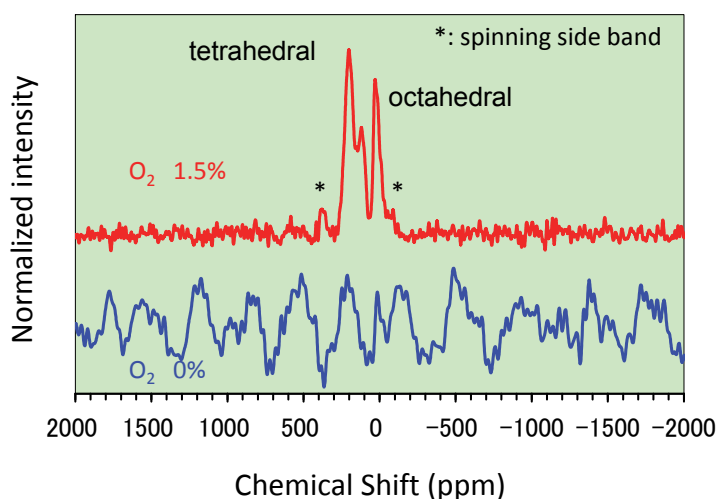
Defect analysis (ESR)



Sample	g	spin density (spins/g)
O_2 0%	2.0034	$3.30E+14$
O_2 1.5%	2.0034	$1.20E+14$

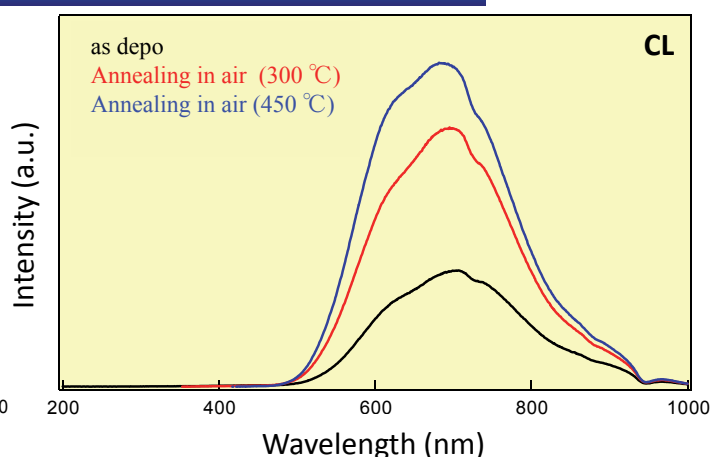
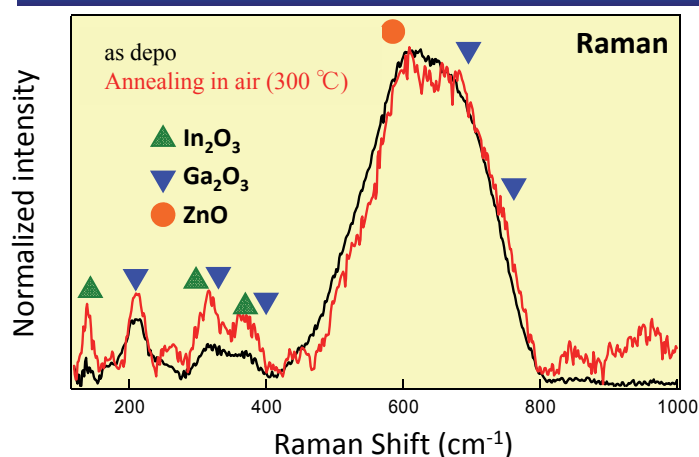
$g=2.0034 \rightarrow$ Defect(IGZO)
Defect density : O_2 0% > O_2 1.5%

Ga coordination analysis (^{71}Ga -solid state NMR)



O_2 1.5% :
Including a 4-coordinated structure or 6-coordination structure.
 O_2 0%:
Exist distorted Ga structure.
(Only spinning side bands are observed.)

Comparison of annealing before and after the change (Raman spectroscopy and CL)



After Annealing : Defect structure is reduced

Raman spectroscopy $\rightarrow$ The half-width is narrowed.

CL $\rightarrow$ CL intensity is increasing. (Non-luminescence center is increasing.)