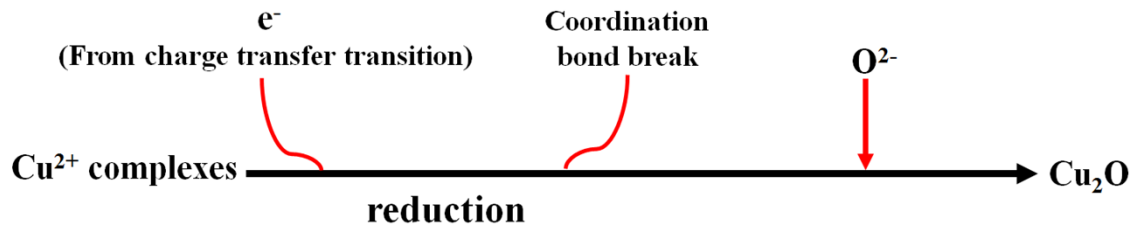# Supplementary material

Recognition of NO_2 and O_3 gases using patterned Cu_2O nanoparticles on IGZO thin films through machine learning
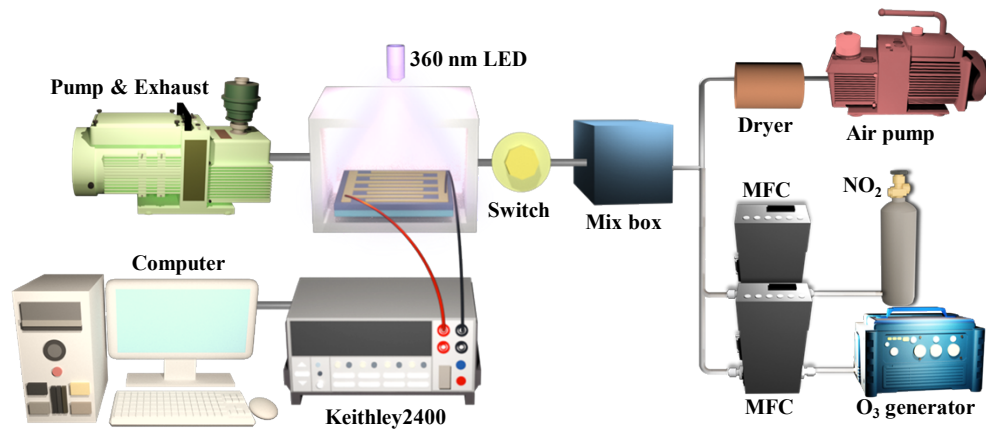
Tsung-Han Wu, Zi-Chun Tseng, Chun-Ying Huang[*]

Department of Applied Materials and Optoelectronic Engineering, National Chi Nan
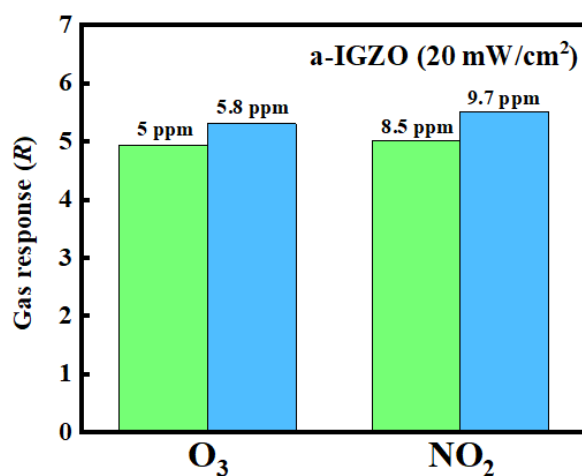
University, Nantou 54561, Taiwan

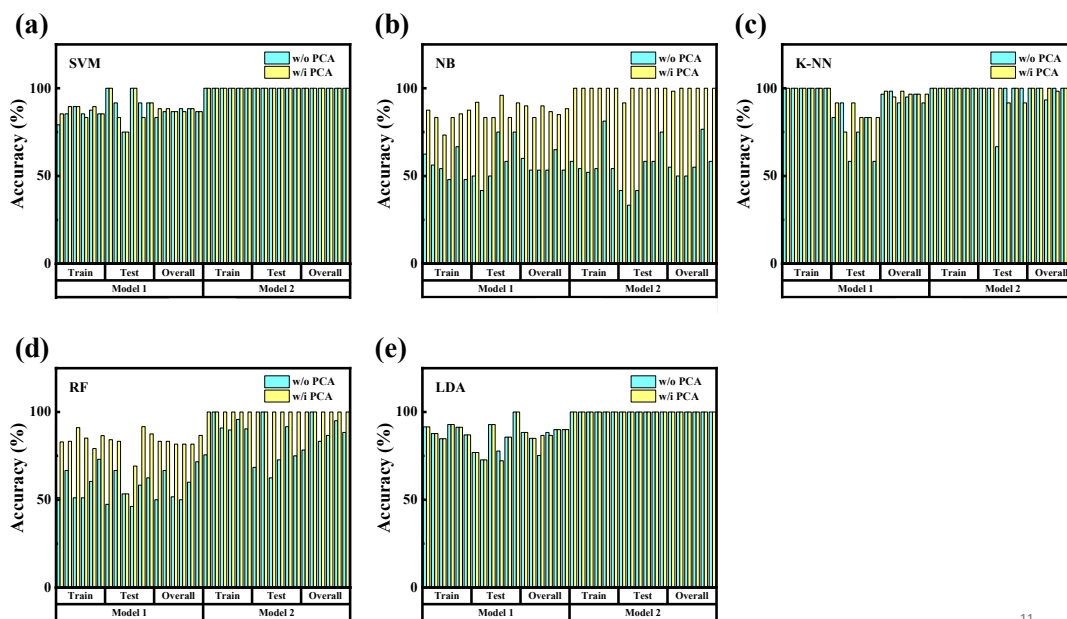*Corresponding author. E-mail: cyhuang0103@ncnu.edu.tw (C. Y. Huang)

Figure S1. Schematic illustration of the UV activation-induced etching mechanism.

Figure S2. Schematic illustration of the gas sensing measurement setup.
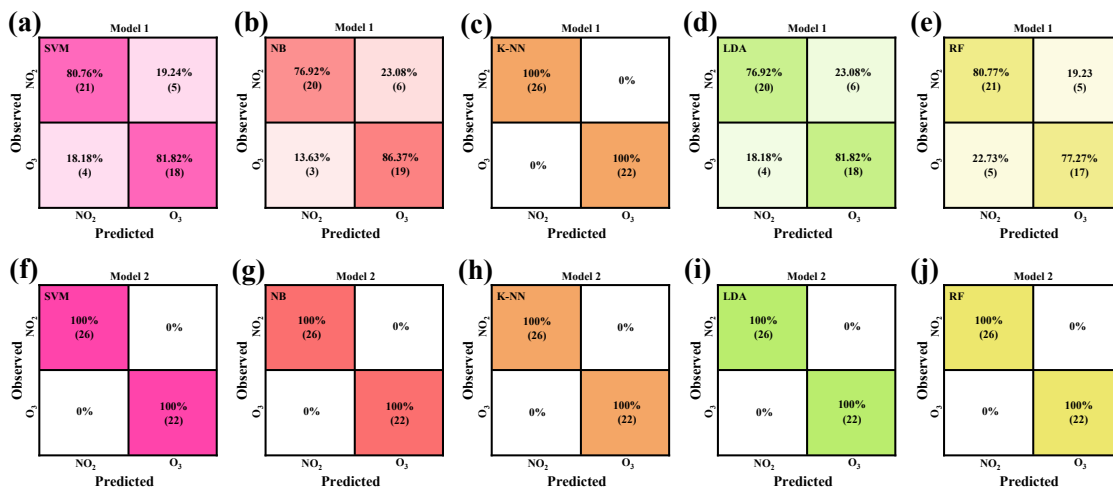
**Figure S3.** Selectivity assessment of the a-IGZO gas sensors.

Figure S4. The accuracy of Model 1 and Model 2 with different seeds using both PCA-driven and non-PCA-driven approaches for (a) Support Vector Machine (SVM), (b) Naive Bayes (NB), (c) K-Nearest Neighbors (KNN), (d) Random Forest (RF), and (e) Linear Discriminant Analysis (LDA).

Figure S5. Confusion matrices in the training set for (a) SVM (model 1), (b) NB (model 1), (c) KNN (model 1), (d) RF (model 1), (e) LDA (model 1), (f) SVM (model 2), (g) NB (model 2), (h) KNN (model 2), (i) RF (model 2), and (j) LDA (model 2).
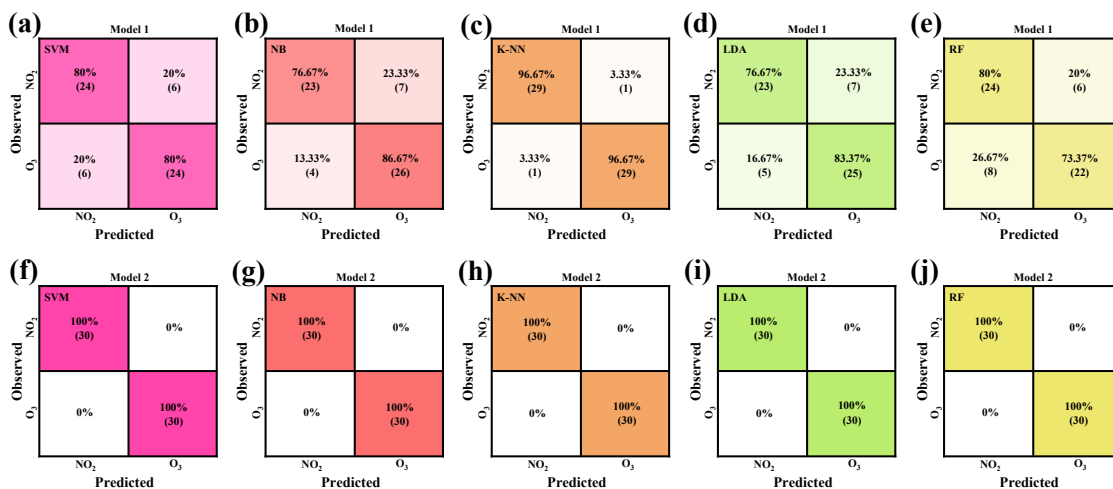
Figure S6. Confusion matrices in the entire set for (a) SVM (model 1), (b) NB (model 1), (c) KNN (model 1), (d) RF (model 1), (e) LDA (model 1), (f) SVM (model 2), (g) NB (model 2), (h) KNN (model 2), (i) RF (model 2), and (j) LDA (model 2).