Supplemental Material

A layered Janus Metastructure for multi-physical detection based on second harmonic wave

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1. The diagrams of the fabrication process flow of the proposed layered structure NJMS

The NJMS is a multilayer structure composed of strontium barium niobate (SBN) [1], indium antimonide (InSb) [2], and a detection layer. SBN can be prepared through metal alkoxide synthesis [3], while InSb can be obtained through synthetic media [4].The detection layer is considered a ordinary material. After arranging the materials, the NJMS can be obtained through the preparation of the layered structure as shown in Fig. S1 [5].

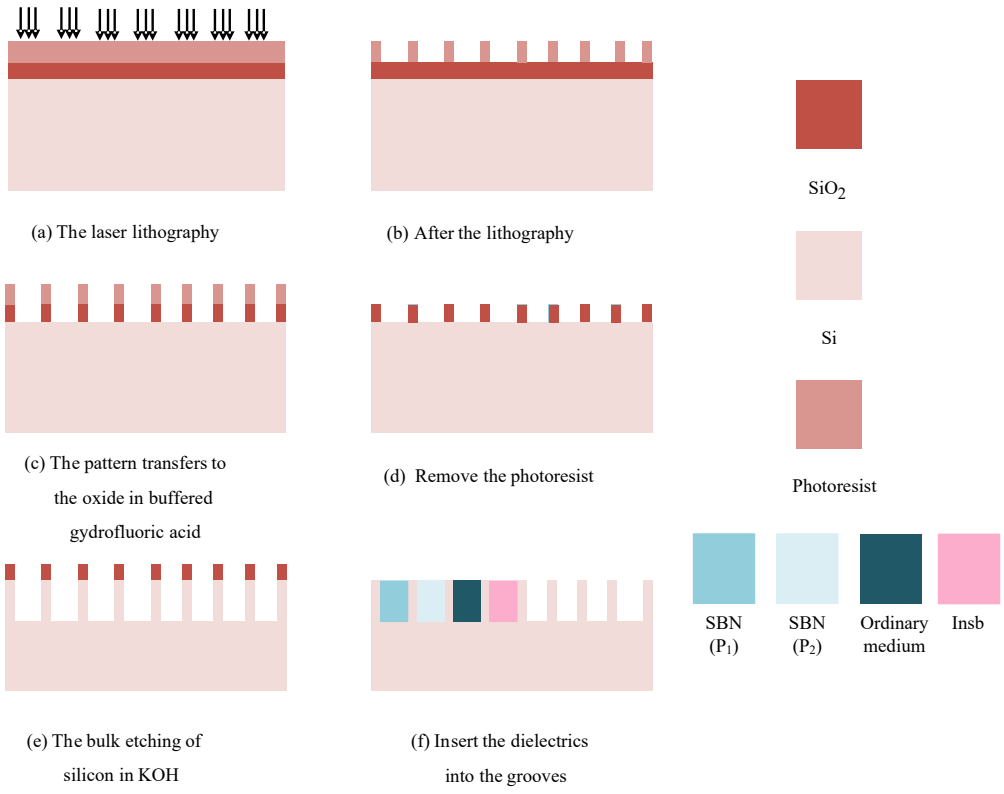

Fig.S1. The diagrams of the fabrication process flow of the proposed layered structure. The specific

materials are denoted expressly on the right side of the process flow.

In the manufacturing process, we adopt the etching method to realize the layered structure. The silicon wafer is chosen to be the substrate and then, take advantage of the wet anisotropic etching technique to etch the vertical grooves with different thicknesses according to the corresponding scale of the two materials in the proposed structure in the silicon wafer. More specifically, the wet anisotropic etching method can be accomplished by utilizing 44 wt% potassium hydroxide (KOH) aqueous solution at 85 ℃, and the thermally grown SiO2 layer can be used as the hard mask during the process of etching. When there generating grooves that conform to the designed conditions of our theoretical research on the silicon substrate, we can add the corresponding material into the corresponding position. From the theoretical perspective, when the height and width of the substrate are extending freely, it can be regarded as the ideal structure and their features are consistent with that of our theoretical analysis. The specific fabrication process flow of our proposed layered structure be found in Figs.S1(a)-(f).

Reference

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