# Persistent Photoconductive Characteristic of ZnO Polycrystalline films

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**Introduction**: Persistent photoconductivity (PPC) wherein the photocurrent continues with a long decay tail even after light being cut off, seriously affecting the performance of optical and electrical devices, for utilizing wide band-gap materials, mostly in negative ways. Therefore, it is very important to know how the photo-excited carriers flow, recombine, and react with the ambient molecules. The PPC in ZnO has been studied intensively in many literatures and several models have been proposed. Generally, it was suggested that their defect and the desorption of surface interaction upon light irradiation plays a key role in controlling the lifetime of charge carriers. In this work, we have investigated comparative PPC for ZnO polycrystalline films as-deposited and annealed sample. The decay time characteristics on the PPC storage charge carrier are discussed.

The ZnO polycrystalline films were prepared by radio frequency (RF) magnetron sputtering. After sputtering the sample was annealed at 400 ºC for 2 h. The crystallinity is developed and surface morphology of the thin films transformed from triangle shape to circle after annealed as show in Fig 1 (XRD and FE-SEM). The typical photocurrent characteristics are shown in Fig. 2. The photocurrents increased gradually after the UV light irradiation and after cutting off the UV light, gradually decreased with a very long tail. The defects and surface properties have a great influence on the generation and storage of photogenerated charges. Especially ambient condition such as oxygen or hydrogen in the measurement strongly influences in its characteristics which will be discussed precisely in the presentation.

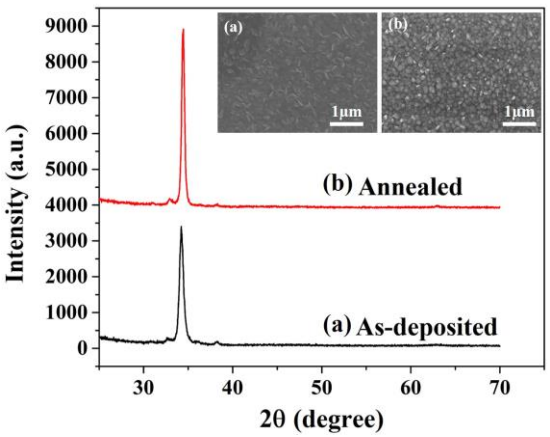


Fig.1 XRD and FE-SEM of polycrystalline films

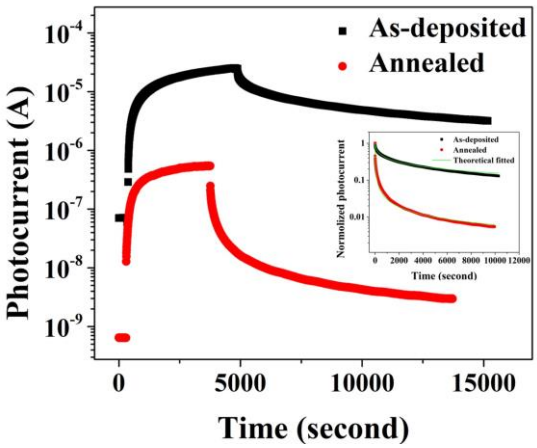


Fig. 2 Photocurrent-time curve and decay characteristic fitted with theoretical