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化学浴析出法より高配向性酸化亜鉛ナノナノロッド作製

Well-ordered ZnO Nanorods Growth by Chemical Bath Deposition

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Recent decade, ZnO nanostructures including nanorods, nanowires have been investigated for applying in photovoltaic devices, and piezoelectric generators, etc. One-dimensional arrays of ZnO nanostructures had been fabricated by physical and chemical methods. However, the synthesis method is still needed to be improved for real commercial application. Particularly, the ZnO nanostructures for flexible device are becoming much important.

In this research, we fabricated well-ordered ZnO nanorods on flexible polyethylene naphtalate (PEN) substrate comparing to other AZO, ITO, quartz substrates by chemical bath deposition (CBD) method. In CBD process substrates were immersed in a solution containing 25 mM $\text{Zn}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ and 12.5 mM hexamethylenetetramine ($\text{C}_6\text{H}_{12}\text{N}_4$, HMTA) for 5 hours at 95°C.

It was found that well-ordered ZnO nanorods were fabricated with self-catalysts obtained from as-deposited ZnO film on AZO, ITO, quartz as well as the flexible PEN substrates. The nanorods with length of 1~1.5 μm and diameters 60~200 nm were obtained, as shown in Fig. 1. The optical transmittance was 60% obtained from that ZnO nanorods on PEN substrate. The other optical and electrical properties will also be reported later.

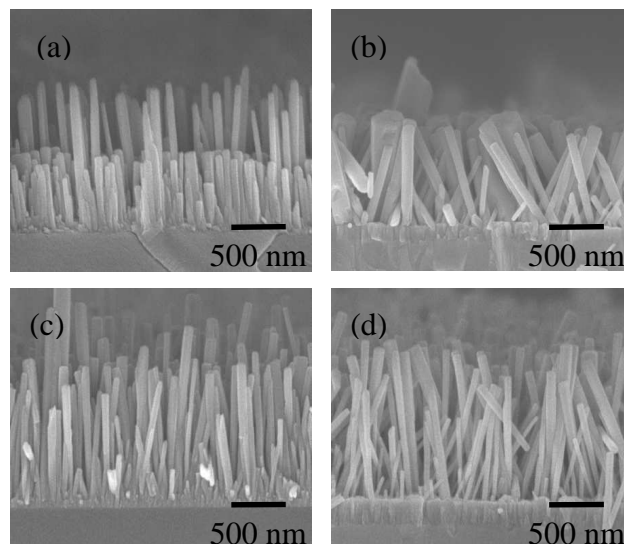


Fig. 1 FE- SEM images of nanorods fabricated on (a) AZO (b) ITO (c) quartz (d) PEN substrates

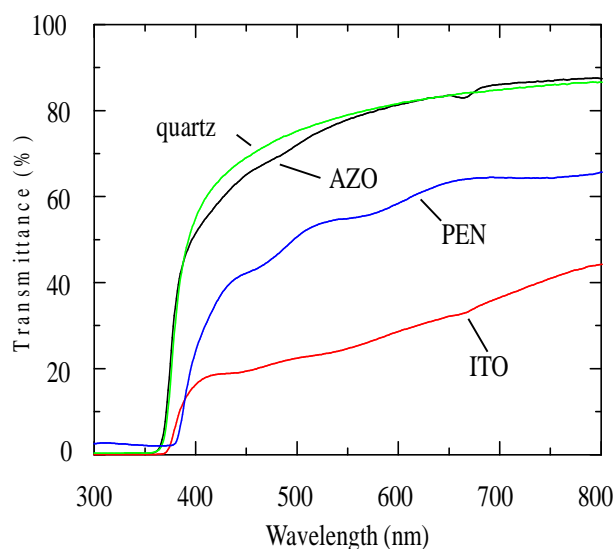


Fig. 2 Optical transmittance spectra of ZnO nanorods fabricated on AZO, ITO, quartz, PEN substrates.