

Effect of substrate on the growth of ZnO nanorods by low temperature solution method

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A simple and low cost soft route has been developed to the direct large-scale synthesis of highly oriented ZnO nanorods and horizontal side faceted sheet-like nanostructures at 90°C on zinc foil, steel alloy and ITO glass substrate. FE-SEM analysis shows that aligned ZnO nanorods with diameter 40–80 nm and 300 nm – 1 μm long have been grown on zinc foil and steel alloy substrates. The side faceted sheet-like ZnO nanostructures grown on ITO glass substrate have diameter between 100–200 nm and their length between 400 nm – 1 μm. These substrates are chosen for their different compatibilities with ZnO crystals. The growth and formation of aligned and sheet-like nanorods are controlled by reaction concentration, pH, temperature, and surface of substrate. The X-ray diffraction (XRD) and transmission electron microscopy (TEM) studies shows that the ZnO nanostructures are single crystalline in nature and they grow along c-axis of the crystal plane. The environmentally benign ZnO nanostructures expected to find promising potential for optoelectronic and environmental applications.