## Morphological evolution of ZnO nanowires using varioussubstrates

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In recent years, ZnOnanostructures have drawn considerable attentions for the development offuturistic electronic devices due to their superior structural and optical properties. As the growth of ZnO nanowires by MOCVD is a bottom-up technique, the nature of substrates has a vital role for the dimension and alignment of the nanowires. However, in the pursuit of next generation ZnO basednanodevices, it would be highly preferred if well-ordered ZnO nanowires could be obtained on various substrates like sapphire, silicon, glass etc. Vertically aligned nanowires were grown on A and C-plane sapphire substrates, whereas nanopencils were obtained on R-plane sapphire substrates. In addition, C-axisoriented vertical nanowires were also found using an interfacial layer (aluminum nitride film) on silicon substrates. On the other hand, long nanowires were found on Ga-doped ZnO film on glass substrates. Structural and optical properties of the ZnO nanowires on various substrates were also investigated.

Keywords: ZnO, Nanowires, MOCVD, Morphology



## A comparative study of grinding mill type on aluminiumpowders with carbon nano tube: traditional ball mill and planetary ball mill

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Grinding characteristics foraluminium and carbon nanotubes (CNTs) powder during traditional and planetaryball milling investigated from the viewpoint of particle behaviour with the aimat developing CNT-dispersed samples ground based on powder metallurgy routes. In this work, a comparison between the pure aluminium and CNT input aluminiumgrinding was carried out to determine grinding time effect on size reduction. We observed that the use of the curly small-diameter multi-walled carbonnanotubes (MWCNTs) attributed to the beneficial role of the MWCNTs as grindingaids. It is suggested that careful choices of the sizes of CNTs and Al powderswould allow fine-grinding of composite particles with uniformly distributed CNTreinforcements thereby ensuring improved properties of the final compositesproduced by low-temperature compacting.

Keywords: aluminium, CNT, Planetaryball mill, grinding, mechanical alloying