Excellent properties of Indium Tin Oxide-Carbon Nano tube Nano composites at low temperatures by Nano Cluster Deposition technique

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Abstract : Indium tin oxide (ITO) - SWNT nano crystalline composites was synthesized at low temperature(~ 250 °C)using Nano Cluster Deposition technique by Metal Orhoganic Chemical Vapor Deposition method. XRD patterns of ITO- SWNT composite shows pure cubic phases without any secondary phase. I-V measurement gives resistance of 12 ohms for Sn doped (3 wt %) indium oxide-SWNT composites. The electrical conductivity of the nano composites is significantly enhanced compared to the SWNT.
Key Words : nano composites, ITO, electrical properties, carbon nano tubes, solar cells

1. 서 론

High thermal and chemical stability and large surface area make CNTs an ideal platform for many nano materials systems. Several applications were proposed for CNTs many of which are concerned with conductive or high strength composites [1]. Indium tin oxide (ITO), an n-type transparent conducting oxide (TCO), has been extensively explored for electronic and optoelectronic applications utilizing the unique properties of the high optical transparency of ITO in the visible region and its controllable low resistivity. Recently, research has been conducted on ITO nanostructures by both physical and chemical methods, for potential applications in high-emission, functional glass and electronic and memory devices [2]

2. 결과 및 토의

In this communication, we describe a simple, efficient approach to large-scale synthesis of ITO/ SWCNT nano composites using porous SWCNT used as template. XRD patterns of ITO- SWNT composite shows pure cubic phases without any secondary phase. I-V measurement gives resistance of 12 ohms for Sn doped (write here how much) indium oxide-SWNT composites. The electrical conductivity of the nano composites is significantly enhanced compared to the SWNT. TEM is undertaken to reveal more clearly the structure and the phases formed. This study is being tried for practical application in Dye synthesis solar cells (DSSC) and electrode in Li ion batteries.

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