Room temperature synthesis of indium tin oxide nanotubes with high precision wall thickness by electroless deposition

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Conductive nanotubes consisting of indium tin oxide (ITO) were fabricated by electroless deposition using ion track etched polycarbonate templates. To produce nanotubes (NTs) with thin walls and small surface roughness, the tubes were generated by a multistep procedure under aqueous conditions. The approach reported below yields open end nanotubes with well defined outer diameter and wall thickness. In the past, zinc oxide films were mostly preferred and were synthesized using electroless deposition based on aqueous solutions. All these methods previously developed, are not adaptable in the case of ITO nanotubes, even with modifications. In the present work, therefore, we investigated the necessary conditions for the growth of ITO-NTs to achieve a wall thickness of around 10 nm. In addition, the effects of pH and reductive concentrations for the formation of ITO-NTs are also discussed.