

Enhanced Adhesion Strength of ZnO Nanopillar Arrays of Flexible Substrates for Artificial Basilar Membrane

김련탁¹, 홍아라², 한윤봉^{1,2,*}, 안민선¹
¹전북대학교 화학공학과; ²전북대학교 BIN 융합공학과
(ybhahn@jbnu.ac.kr*)

Piezoelectric zinc oxide (ZnO) nanopillar arrays were grown on flexible substrates to make an artificial basilar membrane (ABM) which has a xylophone-like structure. The ZnO nanopillars were synthesized in solution at low temperatures (< 100 oC). To selectively fabricate the xylophone-like ABM structure, a hybrid approach combining top-down photolithography and bottom-up chemical growth has been used. A special concern was focused on the adhesion enhancement of ZnO nanopillar arrays on a flexible substrate. Strong adhesion of nanopillars on polyimide was achieved by oxygen-plasma treatment followed by fluorinated-carbon deposition on the plasma-treated substrate. The characterization of ZnO nanopillar arrays and the process optimization of ABM fabrication have been carried out in terms of structural and electrical properties.