

Development of a Mask-less Nanofabrication Process for SnO₂ Periodic Nanostructure

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Nowadays, nanostructure fabrications have attracted much attention because of their importance in nano devices. Several lithographic processes are well known for this purpose. It should be noted, however, that these processes are very expensive and cannot be scale up, because of need of clean room facility. On the other hand, Anodic Aluminum Oxide (AAO) is promising mask-less technique for this purpose with possibility of large scale fabrication at low temperatures. Here, we have attempted to prepare SnO₂ nanorods by using an AAO film as a template. Homogeneous Al films were thermal deposited from Al source to a thickness of 200-500 nm on borosilicate glass substrates. The non-wettability between glass and Al is solved by using a thin buffer layer of Cr which is also deposited by thermal evaporation technique. The AAO template is prepared by anodization technique. The nanopores were uniform in diameter and highly ordered. Pore diameter and distribution is controlled by varying parameters like shape of cathode and applied voltage. Nanopores with diameters ranging between 20 and 40 nm were fabricated using this method. After anodization, the pore widening was done by using H₂SO₄ solution. The detail anodization conditions and the parameters will be presented. SnO₂ periodic nanostructures are obtained by AAO template. SnO₂ nanostructured films are obtained by sol-gel method. Preliminary study of gas sensing properties of SnO₂ nanoporous thin films will be demonstrated.

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