Electrochemical Method for Removing Thick Barrier Layer in Nanoporous Anodic Alumina

M.P Montero-Rama, A. Viterisi, C. Eckstein, J. Ferré-Borrull and L.F Marsal*

Departament d'Enginyeria Electrònica, Elèctrica i Automàtica, Universitat Rovira i Virgili, Avinguda dels Països Catalans, 26, 43007 Tarragona, Spain.
Lluis.marsal@urv.cat

Nanoporous anodic alumina (NAA) has attracted a great deal of interest in the last decades because of its wide range of applications. The main properties of NAA are its chemical stability, its mechanical durability, the cost-effective, easily up-scalable production process and the possibility to taylor nanopore sizes and interpore distances over a very wide range of values. As the NAA is obtained by anodization of aluminium foils, we can use the aluminium foil as an electrical back contact. However, since the NAA presents a thick barrier layer at the bottom side, we need to remove this barrier layer to obtain a good electrical contact.[1] In this work, we present a new method to remove this barrier layer. Self-ordered array of nanopores was obtained using the 2 steps anodiazation[2,3]. Following a partially etching in phosphoric acid was performed and a re-anodized step was carried out at constant current.[4] This results in the formation of several nanoscopic channels in the barrier layer, which lead to its complete removal upon a final chemical etching step, remaining intact the pore structure and obtaining an electrical back contact.

Acknowledgements: This work was supported in part by the Spanish Ministry of Economy and Competitiveness TEC2015-71324-R (MINECO/FEDER), the Catalan authority AGAUR 2017SGR1527, and ICREA under the ICREA Academia Award.

References

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Figures

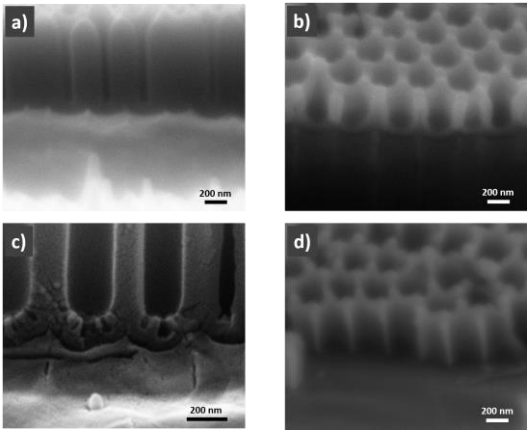

Figure 1: Cross-section views SEM of a phosphoric NAA **a)** after the two step anodization. **b)** after the partial pore widening. **c)** after re-anodization at constant current. **d)** after final pore widening. Sacles are indicated in the pictures.