

Nanoengineering properties through porous alumina

Marisol Martín-González, Olga Caballero-Calero, Alejandra Ruiz-de-Clavijo, Liliana Vera Londoño, Jaime Andrés Pérez-Taborda, Pedro M. Resende, Begoña Abad, Miguel Muñoz-Rojo, Pol Torres², Xavier Álvarez²

Instituto de Microelectrónica de Madrid (IMM-CSIC), Calle de Isaac Newton 8, Tres Cantos,
28760 Madrid, Spain

Universidad Autónoma de Barcelona (UAB), Bellaterra, 08193 Barcelona, Spain
marisol@imm.cnm.csic.es

The understanding of how the properties of the materials, such as thermal conductivity and electrical conductivity, can be tailored by growing nano-scale structures that affect them, is the main aim of this work. The fabrication of nanowires with diameters down to 12 nm and the recent development of three-dimensional nanostructured networks based on the controlled pulsed anodization of aluminum [1] open the possibility of tailoring the properties in a certain range.

A review of ways of tailoring different properties of materials through nanostructuring with the aid of porous alumina templates will be presented. For instance, in the case of the thermal conductivity, it has been demonstrated how this parameter can be experimentally changed and measured [2]. Moreover, the understanding of the reasons behind this change and how to control from a theoretical point of view has been also pursued. In the case of electrical conductivity, the effect of topological insulating appears in different materials when they are structured at the nano-scale [3].

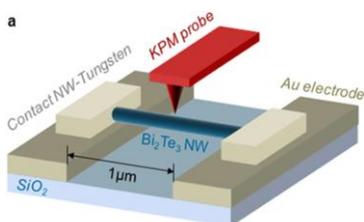


Figure 1: Measurement arrangement for the measurement of the electrical conductivity on the surface of a nanowire [3]

References

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