

## Welcome to Journal of Materials Science and Nanotechnology

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Why one more journal on materials and/or nanotechnology? Well, we all live in a nano-materials world. Trivially enough, each and every object, tool or device is made up of structured matter. At the same time, matter is intrinsically structured at the nanoscale level, via ions, atoms and molecules, and related assemblies (i.e. clusters, agglomerates and aggregates, difference see [1]). For such a broad scope, room is there for much additional work and players, as we all think that materials science and nanotechnology both have a bright future. Shadows could come as well, first with the issue of health risks. Still we do not know much about the danger of the new possible products based on nanomaterials, due to the persistent lack of long-term experimentation data on animals and in real natural environments, and a high level of precautions should be maintained. For sure, sustainability is the keyword for science and technology development in the 21st century. In this respect, nanoscience poses new issues to be aware of, but also promises solutions like active and intelligent (smart) materials, and bio-degradable materials to reduce pollution.

When we say 'nanomaterials' we implicitly give it for certain that a good capability of driving this nanostructuring is with us. May it be based on controlled (natural) self-assembly, or with artificial (i.e. lithographically) engineered methods, both approaches come under 'nanotechnology'. The former being wide in amount of structured matter (typically evaluated in surface area), while the latter being more precise and defect-free, as it is more artificial, yet much time consuming and limited in amount of patterned/fabricated substance. In designing and preparing these novel materials we are using more and more nanotechnology: scanning probe microscopes, but also other high-precision techniques (e.g. optical tweezers, plasmonics to manipulate light, etc.). How far are still we from the wonderful nanotechnology promises already put forward almost thirty years ago with Drexler views [2]? Still a lot: we are asking more questions without answering many of the basic ones already there since the beginning of nanotechnology, like the dominating role of adhesion against macroscopic contact mechanics at the submicron scale. Yet sooner or later all the deal of nanoscale knowledge will come into real applications, while in some fields like environment with e.g. plasmon-based

chemical sensors and biomedical assays it is already there at hand. So the *Journal of Materials Science and Nanotechnology* will be one more front end soldier in this fight for knowledge and its application in everyday life.

As an Editorial Board member I'll be proud to give my contribution to the development of the *Journal*. At the Italian Institute of Technology where I work, many proud scientists are playing at the top frontiers of nanomaterials, in both synthesis (assembly of differently shaped nanocrystals [3]) and applications (by wetting properties control and nanocomposites, see e.g. [4]). For my small part I'm working mainly with anodic porous alumina. This nanotechnological material is prepared by electrochemical anodization in aqueous acid, on extended surfaces (1-10 cm<sup>2</sup> size), and belong to the class of self-assembled materials. Our envisaged applications so far are as a SERS substrate [5], as the surface for electrical (impedance spectroscopy) or MEMS based chemical or bio sensors with efficiency augmented thanks to its porosity [6], as the coating of surfaces of permanent implants in dentistry or orthopedics to improve cell adhesion and proliferation [7], possibly coupled with localized drug delivery [8], or as a peculiar filler particle, after ball milling, for nanocomposites, in particular dental restorative ones [9]. Therefore, as an Editorial Board member I invite hereby all *Journal* audience dealing with nano-porous materials, with nanocomposites especially focused on improved mechanical properties, or in general on scanning probe microscopy (AFM in particular), to submit their future works to my attention. Welcome to *Journal of Materials Science and Nanotechnology* and to its future contributors!

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