DM100 Series
Product introduction article

Setting a standard

on induction heating of nanoparticles

(or, how we call it, “Induction nanoHeating”)

The revolution in nanotechnology is mainly a revolution in instrumentation. New advances in scientific instrumentation technology are what have made it possible for us to observe and manipulate matter at the nanoscale, the frontier where classical physics meets quantum physics. Nanoparticles, for example, are not new: what has changed dramatically over the last few decades is what we know of them, and this is due to our recent ability to create and characterize them and to observe their behavior.

One of the most interesting properties of certain nanoparticles is that they are able to absorb energy from variable magnetic fields and transform this energy into heat. This interesting property is being studied by scientists all over the world for use in a wide variety of applications, including the treatment of cancer, magnetic hyperthermia, the controlled release of drugs, thermal treatment of materials and many others which are constantly being discovered.

At nB, we use the expression *Induction nanoHeating* (InH) to refer to all of the applications of Induction heating of nanomaterials. It is not a standard term (yet!), but we can use it when talking to customers or partners as a simple and comprehensive way to refer to all these new and constantly expanding fields.

The various applications we can imagine for InH may bring about very different final procedures. For example, thermal treatment of materials assisted by induction heating is a procedure which is very different from the ablation of brain tumors by magnetic hyperthermia. However, in each final application, as in all the prior stages of research, there is some device which applies the magnetic field. As this is a new technology, these devices – up until very recently – have had to be constructed in a home-made fashion by the first pioneers, leading to great difficulties for the advancement of the technique and generating scientific results which were difficult to validate and even more difficult to compare.

This fledgling situation in an area of scientific interest ends when standards in terminology are established, both in the indicators of the quality of an experimental result and in the aspects of interest to scientific publications. During this early period instrumentation plays a leading role.

The needs for instrumentation in the development of applications for the InH run from the calorimetric study of magnetic colloids´ power absorption to the application of fields in human beings, as well as in *in vitro* and *in vivo* studies and in multiple configurations from the very development of the nanoparticle under study to its final application.

nB nanoScale Biomagnetics is a new Spanish spin-off company, born of the successful career path of the Magnetic Hyperthermia Group of the Institute of Nanoscience of Aragón. Since its foundation in 2008, nB has carried out intense R+D work orientated towards the development of instruments for this new area both in research and final application.

En 2011, nB launched its first product, aimed towards the initial lab stages: the DM100 Series, the only integral solution for InH research. The devices of the DM100 Series are not only cutting edge lab instruments, but also pursue the goal of implementing a quality standard in lab measurements where the principles and applications of InH are studied.

All configurations of the DM100 system are self-contained workstations which combine an advanced and powerful magnetic field generator, housings and accessories for the most varied samples and lab animals, highest quality sensors, and MANIAC, the only software environment for InH research.

Thanks to the great precision of its field generator and its measurement probes, the DM100 system dramatically expands the range of validity of experimental results, thereby guaranteeing - for the first time - reliable, repeatable and contrastable results.

MANIAC, the original nB software for the DM100, facilitates the programming and control of simple or sequential experiments, records all the information from sensors and incidences, generates graphic and analytical reports, makes typical calculations such as SAR or ILP, and can integrate practically any other type of external sensor which DM100 will offer in the future, or which the researcher him or herself might wish to integrate into his/her system.

nB has developed and marketed the DM100 Series, looking after each detail of its design and manufacture, constantly improving the users' experience and the quality of the measurement, convinced that it is helping to generate a standard in instrumentation for InH which will contribute to the imminent routine implementation of new and promising therapies and technologies

DM100 series

The next step on
Inductive nanoHeating Research

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