About Massimiliano Lanzi

Born in Bologna in 1968, Massimiliano Lanzi achieved a High School Diploma from Enrico Fermi Scientific High School in Bologna (1987) and then attended a course in Industrial Chemistry at the University of Bologna, achieving a score of 110/110 cum laude (1993) . His University career was enriched with a Ph.D. in Industrial Chemistry (1997) and a scholarship for post-doctoral research (1998). Author of several scientific publications, he is currently part of the Polymers Group of the Department of Industrial Chemistry and Materials, University of Bologna, which deals with the synthesis and study of functional macromolecular materials for advanced applications, the preparation of monomers to their polymerization using different methods for obtaining chemical properties and specific molecular characteristics.

The Department of Industrial Chemistry and Materials, University of Bologna

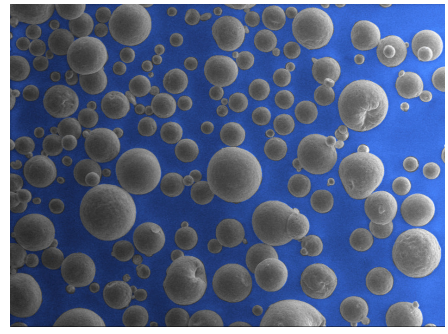
The Department of Industrial Chemistry and Materials, at the University of Bologna plays an important role in the link between academic and industrial research, working on the development of catalytic processes, the study of polymeric materials, the environment and conservation of cultural heritage and biotechnology. The relevance of the Department is certified by a high appreciation of its members both nationally and internationally, evidenced by the large number of qualified scientific production and the prestigious awards received.

Interview with Massimiliano Lanzi-Pelma open day at the Milan Triennale

How did the collaboration start between Pelma and the University of Bologna?
The Department of Industrial Chemistry and Materials at the University of Bologna plays an important role in the link between academic and industrial research, working on the development of catalytic processes, the study of polymeric materials, the environment and conservation of cultural heritage and biotechnology. The relevance of the Department is certified by a high appreciation of its members both nationally and internationally, evidenced by the large number of qualified scientific production and awards received, and the collaboration with Pelma originated out of this expertise of our university centre. I am part of the Polymer Group of the Department of Industrial Chemistry and Materials, which deals with the synthesis and study of functional macromolecular materials for advanced applications, from the preparation of monomers to their polymerization using different methods for obtaining chemical properties and specific molecular characteristics.

At a physical level, how does the process that allows the reduction of temperature work?
With the tests carried out in our laboratories, we have highlighted the strong ability of Thermofresh polyurethane to absorb heat, being able to lower the surface temperature body to a range between 2° and 4° C. Inside the Thermofresh polyurethane the PCM capsules are solid at room temperature, but when they come into contact with a warmer body they melt inside, absorbing heat, in fact, from the body itself. In this way, the polyurethane acquires an extraordinary ability to remain cool.

What are Phase Change Materials (PCM)?
Initially used in aerospace by NASA, the PCM are now ideal in applications which need to combine flexibility, breathability and heat transfer. The PCM microcapsules are able to lower the temperature of the material. This special feature derives from their particular nature: at room temperature, in fact, they are solid state, but when this rises and exceeds a certain threshold (in the case of Thermofresh 28° and 35° C), they melt, accumulating heat that is taken from the environment. When, instead, the temperature drops, the microcapsules return to solid state and give off heat.



How are PCM inserted into the polyurethane?
The PCM are not an absolute novelty in terms of application, they are already being used in the fibers for the production of “technical” textiles for example for technical-sports clothing. Pelma, thanks to the unique process Controlled

Predispersion System, has managed to insert these microcapsules during the polymerization process of the material and this is the big innovation.

Is Thermofresh colder than any other polyurethane?
No. Thermofresh is not colder than any other polyurethane; Thermofresh, absorbing the heat emanating from a body in contact with the material, has the natural ability to maintain a constant temperature, in the range of normal use (between 28 and 35° C) , for longer compared to a conventional polyurethane. This way overheating of the body is avoided due to a reduced heat exchange with the surroundings.

What are the benefits over other materials?
If we think of the polyurethane mattress, being able to decrease the annoying phenomenon of excessive summer heat by contact certainly encourages rest conditions. An important aspect of PCM is that the process of melting and solidification of the same is very simple and reversible, so the movements, which of course everyone makes during sleep, are sufficient to continuously reactivate this process. Even the unpleasant feeling of sitting on a chair “heated” by a person sitting before (think of the chairs in the cinema) can be avoided in no time thanks to Thermofresh.

Is it a process that lasts over time?
Yes, our laboratory tests (Aging Tests) have shown that it is a fully reversible process, and which continues indefinitely over time.

During the cold season, what are the advantages of this material?
We have seen that the PCM come into action only at a temperature between 18° and 40° C, thus in the case of the mattress we can be certain that we will not feel cold in winter. However, if we think of other uses of this material such as shoe insoles, the situation changes. When wearing shoes around the house, the heat of the foot will activate the PCM that will melt thus “removing” heat from the foot. When leaving the house in winter months, for reversibility of the process, the PCM will tend to re-solidify releasing the accumulated heat, keeping the foot warmer.

What are the possible applications?
It is a revolutionary material that has different findings. The sectors involved are varied, not only mattresses or pillows, but also the seats for chairs and lounges, technical and sports clothing, footwear, the medical industry, packaging; In short, all those areas which involve that annoying feeling of overheating due to contact with padding. For example, think of motorcycle riders who need to wear a helmet for a long time or those who need to wear a temporary prosthesis for injury.



Is Thermofresh also antibacterial and does it prevent the growth of mold and bacteria?
Yes, it’s true. This feature is due to a special treatment that, unlike other bacteriostatic products present on the market, it exploits the natural ability of silver to resist the proliferation of bacteria, one of the primary causes of asthma and allergic diseases, and molds, the main cause of the bad smell and degradation, succeeding, in this way, in preserving over time the hygiene and freshness conditions of polyurethane. The samples we tested through analysis of bacterial growth show the ability to resist the proliferation of bacterial colonies decidedly superior to the samples of conventional foams, as proof of the effectiveness of the material in Thermofresh to withstand bacterial attacks. Thermofresh is able to maintain high hygienic conditions over time, making it ideal for those who suffer from asthma and allergies.

ultra-fresh
antimicrobial technology

Thermofresh is able to lower the temperature by contact, it is antibacterial, but is it also an environmentally friendly material?
To develop Thermofresh, Pelma uses a system, unique in Italy and one of seven in the world, which uses pressure as a blowing agent thereby eliminating any other auxiliary chemicals (CFC/HCFC, methylene chloride, CO2, etc.): Variable Pressure Foaming (VPF). This helps obtain a foamed material with water alone, which is environmentally friendly and recyclable, for reagglomeration, creating regenerated material or as fuel to produce energy. In fact, the controlled combustion of polyurethane waste helps obtain up to 200 Mcal/m3 minimizing the emission of harmful substances. Also the processing waste of the polyurethane foams can be effectively recycled, with a simple grinding and rebonding process, providing valid materials for the interior trim of the car, for the production of thermo-acoustic insulation and for packaging.