AURO and „Nano“

To make a clear statement in advance: nobody will be able to surpass AURO when it comes to our critical skepticism of anything referring to itself as being “nano”.

First of all, this applies to the inflationary usage of the terms “nanotechnology” or “nanoproduct”, both almost having been stylized as synonyms of “modern” and “progressive” by now.

In fact, we consider manufacturing and application of particles whose diameters are in the range of one or few nanometers (= 1 millionth of a millimeter) and which come into immediate contact with the body (textiles, cosmetics, sprays etc.) to be very problematical. We stand in complete agreement in this regard with those people who currently launch email campaigns against nanoproducts, although they do so on account of entirely different motives, i.e. rather obvious competition.

There are essentially three solid scientific reasons for our critical view:

1. Particles being of such an extremely small size as to be veritably referred to as real nanoparticles are hardly warded off by the barriers which have developed in the course of evolution to provide protection against foreign bodies (cellular membranes, cilia, capillary barriers). They behave like gases in the respiratory air volume and as such penetrate into the deepest regions of the lungs. When applied onto the skin or in the blood, they almost behave like soluble or absorbable active substances.

2. Real nanoparticles, i.e. such having a size ranging from one to several nanometers possess completely different physicochemical properties compared to the original material of which they are made or which they resemble in purely chemical regard. This means that a substance otherwise harmless in its “coarse-grained” state can be turned into a problematical one by means of its extreme fragmentation down into the true nano-range.

3. Since it has recently become possible to manufacture products with a narrow a grain-size distribution ranging from approximately 1 to 5 nanometers, and since nano-small particles practically do not occur in such distribution ranges in nature, there simply are no real long-term experiences with products which are exclusively, or almost entirely, contain particles of such extremely small dimensions. This is the same argument with which we always fought against synthetic solvents like isoaliphatic compounds, or synthetic organic pigments like azo dyes. (Oddly enough, today we encounter among these “anti-nano-fighters” people who used to apply such substances without any scruples, and some of them still keep on doing so).

But there are a few very different aspects about the omnipresent nano boom to which we do not approve:

1. A great number of products which are being advertised with the obviously trendy term “nano” do not possess any properties whatsoever that may be associated with real nanoparticles. Consumers are lead to believe in a (currently still effective) association which will not stand up to closer scrutiny.
2. The term “nano” is often used to denote products possessive of small particles which size may be relatively small (approx. 20-100 nanometers = 0.002-0.1 micrometers), however, which properties mostly correspond to those of larger particles in the micrometer range and merely possess a large specific surface. Not the slightest novel property due to nano-dimensions is present — but it looks good on the label.

3. Unfortunately, institutions who should know better but seek profit from the ongoing nano debate are also involved in this conceptual confusion. And naturally, practically any grain, regardless of its actual thickness, can be ornamented by reporting its dimensions in nanometers with the elegant prefix “nano”; a grain of sand will then possess 10,000 nanometers, but a quite common pigment particle of 100 nanometers will thus turn into a “nanoparticle”.
4. “Nano” is frequently merely a fashionable label which is plastered on very common (or at least little innovative) products — just like every third product is being associated with “wellness” (or, until recently, with “feng-shui” – the main thing is that potential customers have become familiar with the fashionable terms produced by the mass media). These are trends and deviations in which AURO has never got involved, as we know.

AURO *Airfresh wallpaint* — A “Nanoproduct” ?

After the critical assessment made in the first section, it should be clear by now: AURO *Airfresh wallpaint* is certainly NOT a “nanoproduct”! As a logical consequence, such a term, or even an according advertisement, cannot be found anywhere in the information that belongs to this product and is released by our company. It is therefore a purely foreign designation or assertion, with which people pursuing quite obvious competitive interests intend to disqualify this successful AURO product.

The more or less distinct association of our fresh-white paint with other conventional products, to which an ambient-air cleaning effect based on a photocatalysis is ascribed, is also false. The AURO product is a completely new development based on fundamentally other (precisely AURO compliant) binding agents and active ingredients and it is not in any way comparable with any conventional products on the market.

Where do the present nano allegations come from now ? There a few “friendly” competitors (as well as representatives of associations who are commonly in league with them, having quite obvious unilateral interests and connections) who — supported by the common mixture of superficial knowledge, or even less, and the unscrupulous-uncritical use of internet search engines (why don’t you google for “nano”?) — attempt attach a “nano label” to AURO *Airfresh wallpaint* which is, according to the given facts, unjust.

The facts are the following: the particle size of the active mineral substances we use are on average at about 0.2 micrometers. For comparison: A “real” nanoparticle would have a size of approx. 0.001-0.005 micrometers — that is smaller by several orders of magnitude! In other words, the mineral substances we use are true pigments, having a comparable size of “normal” pigments (like fine-ground chalk, titanium dioxide, iron oxides, or earth pigments) — for this reason, it has nothing to do with “nano”. As already said, real nanoparticles have a size of 1-5 nanometers — this is one-hundredth and entails in its properties an entirely new world — and in fact perhaps harbors entirely new risks.

It is hence simply illicit if products such as AURO *Airfresh wallpaint* are referred to and accordingly criticized as nanoproducts purely for reasons of competition — even if this happens in a concealed fashion and occasionally behind masks, as the consequences of an immediately identifiable claim of unfair competition are refrained from with good reason.

Do’nt “non-nano” paints contain any particles of “nano” size at all?

They do! ANY fine powder does, hence all pigments and fillers, but also any kind of fine dust, even normal dry garden soil does. The reason for this is rather simple: any fine-ground powder contains larger, medium-sized, fine and even finest particles. The whole thing is described in terms of the so-called “grain-size distribution”, which indicates how many particles are of a specific size. This

can be displayed in the shape of a graphical representation and one invariably obtains a curve with a “hump” almost somewhere in the middle: these are the particles of medium size that occur most abundantly. The curve consequently displays a maximum value at this site.
However, such a distribution invariably also displays particles of utmost smallness — down to the size which characterizes the “nano-range”. They are not many, measured in relation to the most abundant particles of medium size, but they are practically always and inevitably present. Hence, whoever sells paints containing pigments and fillers (and this is what all our competitors exactly do) exposes himself, with a pure alarmism against “nano-sized” pigment particles on behalf of his competitors, to quite uncomfortable questions.

Converts are the worst bigots !

The quality of the present debate gets absurd to a certain extent due to the circumstance that the harshest exponents in the ongoing anti-nano-debate, inasmuch as it relates to paints and, in particular, AURO Fresh White, personally manufacture or propagate numerous products which contain a great deal of ingredients with very low grain sizes — much smaller grain sizes than those of the active minerals in AURO *Airfresh wallpaint* - and hence no nanoparticles according to the abovementioned stringent definition of real nanoparticles, however, “much closer” to this particular range they critically observe themselves.

A few examples of such ingredients:

- Transparent iron oxides as light-protective filters in glazes,
- Micro-fine titanium dioxide as “UV absorbents”,
- Finest particulate silicic acids as matting agents or antisettling agents
- Synthetic, microcrystalline waxes to produce special surface properties
- Silica sol in paints with extreme adhesive properties on almost any substrate.

Numerous other examples could be added to this list. One or several of such extremely fine-particulate particles are found in the products of practically every present-day manufacturer of natural paints — most and foremost in the products of those who go out on a limb against the risks of fine-particulate products (especially one who exposes himself most zealously should undertake the effort to look up the particle sizes of his UV filter pigments based on titanium dioxide and compare them with his own definition of “nanoparticles” ...)

In addition, there is the already mentioned circumstance that all normal pigments and fillers on the market, which are applied to natural paints, inevitably always contain proportions in their grain-size distributions that extend all the way down to the real nano-range, some of which in quite high amounts reaching all the way down to the region of 100 nanometers, i.e. the dimension of “unreal” nanoparticles.

Back to vehicles without converter ?

The current discussion has also taken on yet other strange shapes. For example, in the course of the anti-nano discussion (aiming at the wrong target anyway) the clumsy attempt is made to endow the ambient-air cleaning actions of photo-catalytically effective wall paint (such as AURO *Airfresh wallpaint*) with a negative touch.

The argumentation, rather unreasonable from the scientific perspective, pursues almost the following unusual logics: Since the ambient-air cleaning action of the wall paint proceeds by means of the catalytic degradation of pollutants located on the surface, hazardous degradation products arise.

By following the same logics, the authors must demand that catalytic converters are to be removed from all modern vehicles and that we must turn back to the smog-laden urban air of the 1970s. Because a modern exhaust converter has practically just this effect indeed: it degrades the pollutants in the exhaust fumes (especially uncombusted hydrocarbons in gasoline) by means of its catalytic action on the surface of the converter — thereby producing degradation products, which is the sense of it all. However, as is comprehensible and verifiable by everyone, these degradation products are completely safe — at any rate, they are distinctly less hazardous than the catalytically degraded pollutants themselves.

In the sense of this principle, products such as AURO *Airfresh wallpaint* make an (albeit small) contribution to the decomposition of indoor smog.

Ironically enough, by the way, such wall paints are in principle also capable of degrading such solvent molecule that have petroleum spirit or aliphatic character and are still contained in numerous products of our competitors, despite the strict limitations imposed by the Ordinance on Solvents coming into effect as of January 1, 2007. In addition, these solvents occasionally occur in very high concentrations of up 80% and more (only 30% or, in case of water-based products, 13% will soon be permissible), and, interestingly, some also occur in the products of those who appear to have something against the catalytic degradation of pollutants on wall surfaces.

How is such misleading information possible ?

To make it short: we have a problem with expertise and competence in our line of business. The ecological commitment and/or merchant skills of most people who hold a responsible leadership position among the existing manufacturers of natural paints is undisputed and deserves all respect and recognition.

The technical and especially scientific education and competence shows a different picture: here, there is a blatant deficiency which has more than often led to the introduction of very dubious ingredients the natural paints sector because of plain ignorance.

On the other hand, as is known, AURO is a company led by people of unquestionable scientific competence, from the days of company foundation until today. A small detail just to be mentioned in passing: the doctoral thesis of the founder of AURO was concerned with the catalytic degradation of gases on solid surfaces, hence exactly the same action principle of our *Airfresh wallpaint* ... there is nothing like expertise, especially not a few simple search queries on the internet.

There is yet another factor, and this one is rather sad. AURO is perhaps currently the only manufacturer of natural paints who is successful in Germany and in Europe, having double-digit growth rates to show, whereas a great many of its competitors have been facing great difficulties for quite a while and either concretely ponder on selling their businesses or simply duck and cover.

Instead of looking for the reasons of this negative development within one's own erroneous decision-making (much too late or even outstanding response to the new Ordinance of Solvents, lacking investments in research, lacking development in innovations, desperately clinging to petrochemical ingredients, etc.) they seek salvation in projecting their own failures onto their more successful competitors. This is psychologically comprehensible, but not necessarily reasonable.

Dr. Hermann Fischer, 2006