



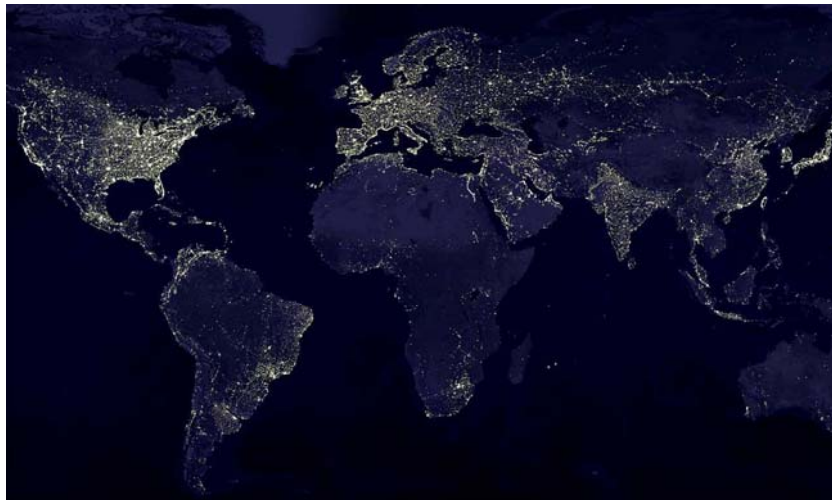
Smart Energy Home - a project with different aspects

Antonio Wehnl – LUWOGÉ - Consult
Sven Mönning – BASF Construction Chemicals

 **BASF**
The Chemical Company

Energy – **the** question of the future

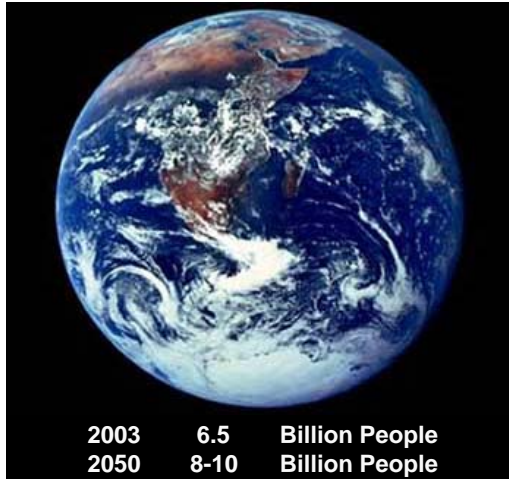
 **BASF**
The Chemical Company



Humanity's Top Ten Problems for next 50 years



1. ENERGY
2. WATER
3. FOOD
4. ENVIRONMENT
5. POVERTY
6. TERRORISM & WAR
7. DISEASE
8. EDUCATION
9. DEMOCRACY
10. POPULATION



Source: Prof. R.E. Smalley, „Our Enery Challenge“, Colombia University, NYC, 23 September 2003

Global megatrends impose challenges



Future challenges



SEH, short introduction



SEH should develop and publish a holistic concept of sustainable, comfortable and healthy living.

Ambition:

- Development of European standards
- Implementation of a quality mark/label for sustainable housing
- Development and testing of new technologies and construction systems
- Active marketing of energy and resource saving technologies

SEH, for people



Technology must take along the people, i.e. it must be easy and usable, to be sustainable and effective.

Realization:

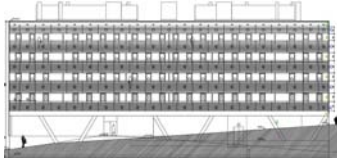
- Development of a social charter for SEH site projects
- Research on the interaction between people and technologies
- Development and implementation of new research methods:
 - EU-Project Living Lab

SEH, state of the art



- Definition of criteria for refurbishment and new buildings
- Completion of the catalogue of requirements:
 - Energy consumption
 - Water consumption
 - Health
 - Living
- Selection of the first two possible SEH project sites:
Barcelona and Paris

SEH, for refurbishments and new constructions



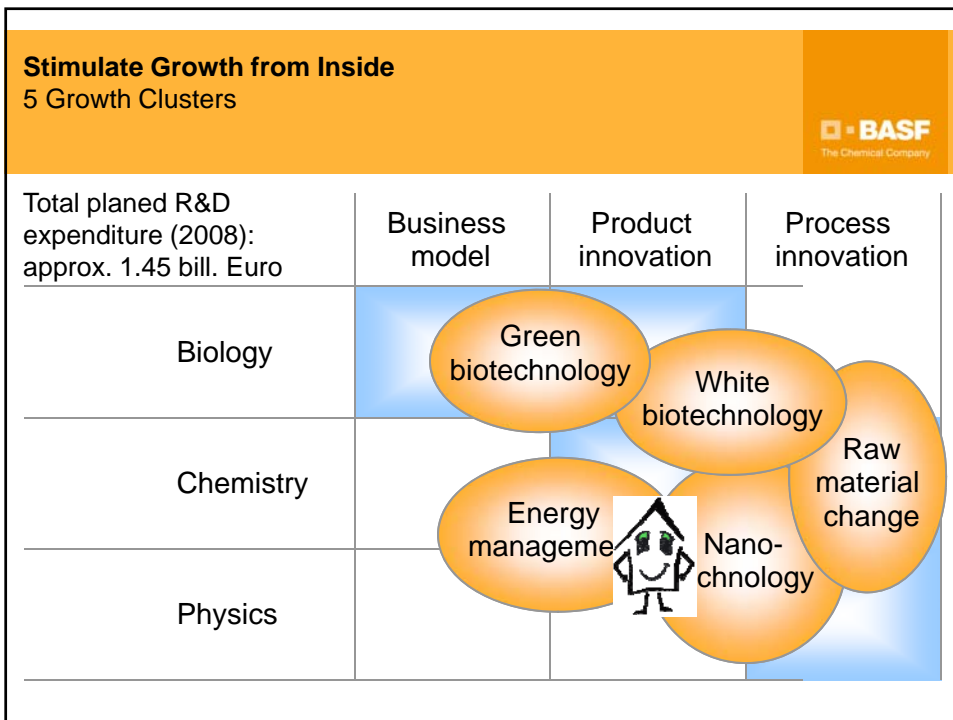
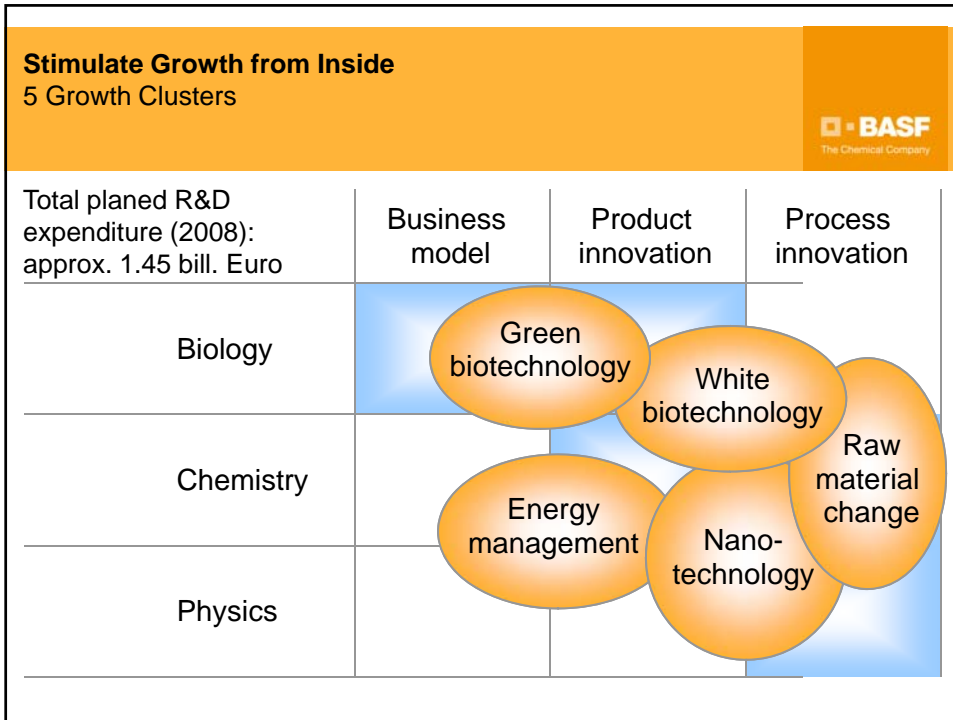
Spain, Barcelona
New buildings

ICF, Paris
rue de Lorraine 6



Partners

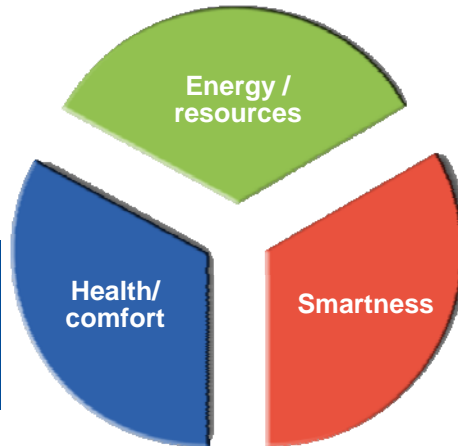




SEH, a project for smart solutions



- Self cleaning surfaces
- Noise reduction
- Air quality



- Nanofoams
- Roof Protection
- Durable Paint
- OLEDs
- PCMs
- Photovoltaics

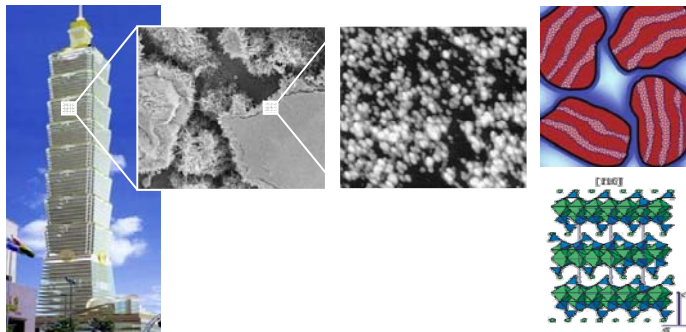
Nanotechnology in construction materials



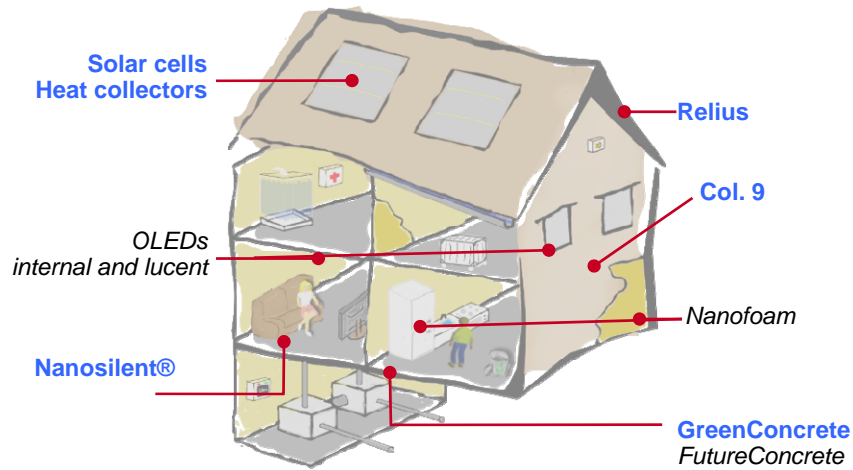
Nanotechnology:

The capacity to **create functional materials**, devices and systems with **novel functions** and properties through the **control of matter** at the nano-scale.

- ▶ Concrete can in good conscience be called a nanomaterial.



Nano....present and future solutions for construction



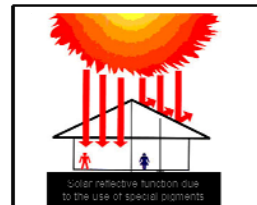
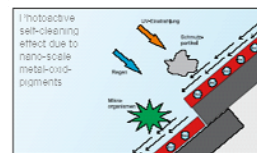
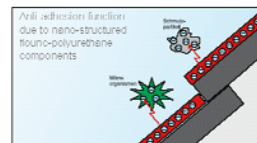
RELIUS Roof Acryl Nano Tech®



Roof Acryl NanoTech is a self-cleaning, extremely weather resistant, cold and heat-resistant roof coating.

Roofs are mainly coated in dark colours. Roof Flex Nano Tech® formulated with special pigments are able to create a heat protection shield. Surface heating will be reduced up to 40-50%. Therefore energy will be saved - e.g. by reduced room-cooling.

Relius is based on nano-structured fluoroc-polyurethane-acryl polymers.



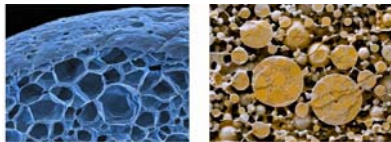
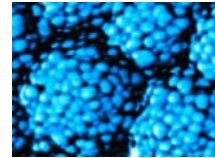
Col. 9: for long lasting durable facades



COL.9® protects facades and paints against dirt and weather due to its very fine nano-structure.

Inorganic nano-particles are embedded and fixed in organic polymer particle water dispersions.

The nano-particles will form a homogenous three dimensional network after application and drying of the paint.



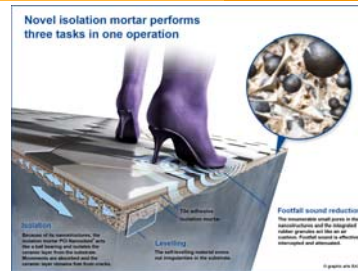
Antiaging - effect for facades
(left: with COL.9, right: without)



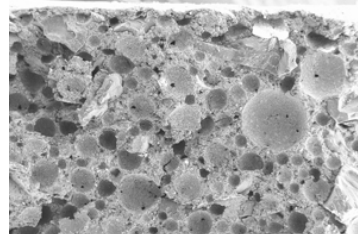
PCI Nanosilent®



- 15 kg of Nanolight® replace 25 kg of conventional flexible mortar
- less cracking of tile floors
- better isolation
- better sound insulation



The isolation mortar derives its special properties from its additives, special polymers and rubber granules. These rubber particles provide high flexibility. In addition it has outstanding isolating properties.



Superplasticizer ... Nano in great mass



Global construction uses 5.2 bill. m³ concrete each year – up to 50% contains superplasticizer

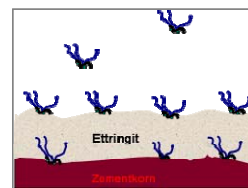
Superplasticizer disperses, maintains the workability and improves the strength properties of concrete.

CO₂-footprint per m³ concrete will be reduced by up to 60% less cement gets necessary, less energy for handling

What is nano about superplasticizer?

Superplasticizers are poly- carboxylic polymers with a size of view nanometers.

They alter the surface tension of pore water and change the charge and the density of the cement grain surface.

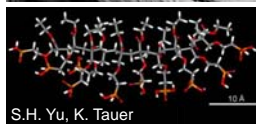
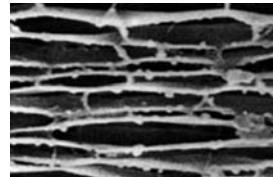


Concrete ... Nano in in the future



Towards new material properties:

Targeted manipulation of the micro- and nanostructure



Mussel shell after removing the inorganic material



Critical weaknesses of concrete:

- High brittleness
- Low absorption of tensile forces

Nano foams

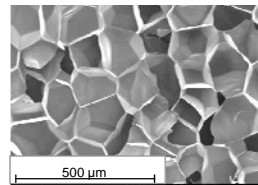


Conventional insulation foams do only reach approximately 50% of the theoretical possible insulation.

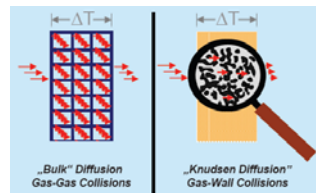
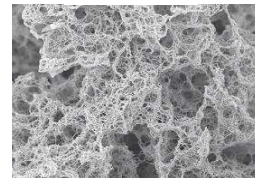
Nano foams: Improved insulation and reduced heat transfer by reduction of gas molecules movement.

Pore sizes of nano foams ca. 100 nm

Conventional foam



Nano foam



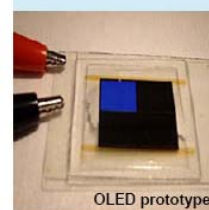
OLEDs



- Maximum design freedom: thin, luminous and flexible
- Expected to consume only half as much energy as conventional energy-saving lamps

- Ultrathin flat screens
- Light panels
- Flexible displays

Market potential:
2010: 3 bill. €
2015: 13 bill. €



OLEDs



2006 2007		small displays
2008		mid & large size displays (e.g. TV and Laptop)
2010		lighting
2012		flexible displays

Public Perception



Donnerstag, 1. April 2004

Die Welt
Sind kleine Fußballer ungesund?
Klein, fein, gemein

DIE ZEIT 20/04/04: In die Röhre geguckt
Nanotechniker haben gewaltige Versprechungen gemacht. Entlösen konnten sie bisher keine einzige davon

Nebenwirkungen aus der Zwergenwelt
Die Nanotechnologie gilt als Zukunftstechnologie schlechthin, doch eine neue Studie warnt vor Gesundheitsgefahren

Mit klebrigen Fingern
In den USA haben Nanoforscher bei den Gefahren erkannt, und in Europa konzentriert man sich auf Max. Risiko

Gefahr aus dem Nichts

TECHNOLOGY

Die Welt des unvorstellbar Kleinen soll zum großen Geschäft werden

Natur und Wissenschaft
Nanotechnik ganz groß

NANOTECH REPORT

NANOTECH MEETS MARKET REALITIES
Nanotechnology developers are aspiring to the daunting challenge of commercialization

Nano

The Start of Something Big

Die Nanotechnik erobert die Chemie

Goldgräber im Zwergenreich

Winzige Hoffnung

Große Zeit für Winzlinge

Das nächste Atom-Zeitalter

A New World Is Born

Aufbruch in die Zwergenwelt

Das nächste Atom-Zeitalter

Manufakturtechnologie – Schlüsseltechnologie des 21. Jahrhunderts

Wunderwerkzeuge für die Zukunft

Risks

Public Perception

Opportunities

Clear Principles for Nanotechnology BASF's Code of Conduct Nanotechnology



Based on our commitment to Responsible Care®, we defined clear principles:

- We identify sources of risk for employees in our laboratories, production plants, packing and storage facilities and eliminate these using appropriate measures.
- We take the risks of new technologies in products and processes seriously and work continuously to identify potential environmental and health risks.
- We are committed to transparency and contribute constructively to public debate and drawing up legislation.

www.corporate.basf.com/de/sustainability/dialog/nanotechnologie/verhaltenskodex.htm

Code of Conduct Nanotechnology

Along with offering opportunities, all new technologies also pose risks and this is true for nanotechnology, too. In order to tap into the opportunities offered by technological progress, we want to use new technologies, when manufacturing, innovative and market-ready products. Only on the basis of these concrete products can a proper assessment be conducted of the potential risks associated with the opportunities these products pose. This means that only the employees in process opportunities and risk on a product basis will make decisions based on new technologies possible. As an innovative company, we have within the process a special responsibility towards our employees, customers, suppliers and society that also extends future generations. The code of conduct spells out the principles on which our work is based.

1. How the employees of BASF develop and use the potential of nanotechnology in order to manufacture products with improved performance or new properties using targeted production and the use of new nanomaterials.

- The protection of human life and the environment is a fundamental priority for our company.
- The primary mission of BASF for our employees in our laboratories, production plants, packing facilities and storage facilities and eliminate these using the appropriate measures. In the event of any health and environmental risks arising as a result of our operations, we take immediate action.