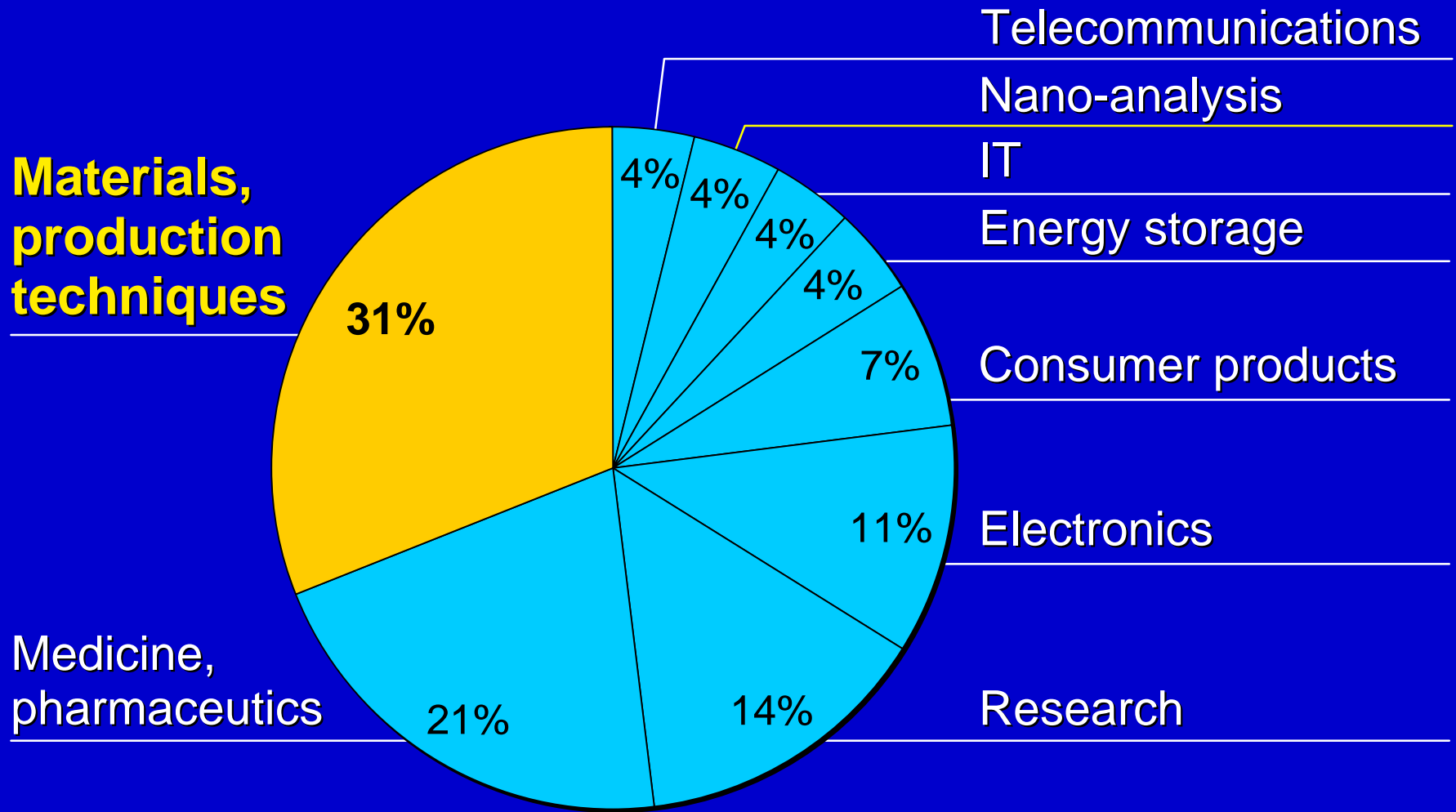


US nanotechnology start-ups and spin-offs and their focus



Nanotechnology funding

Million €

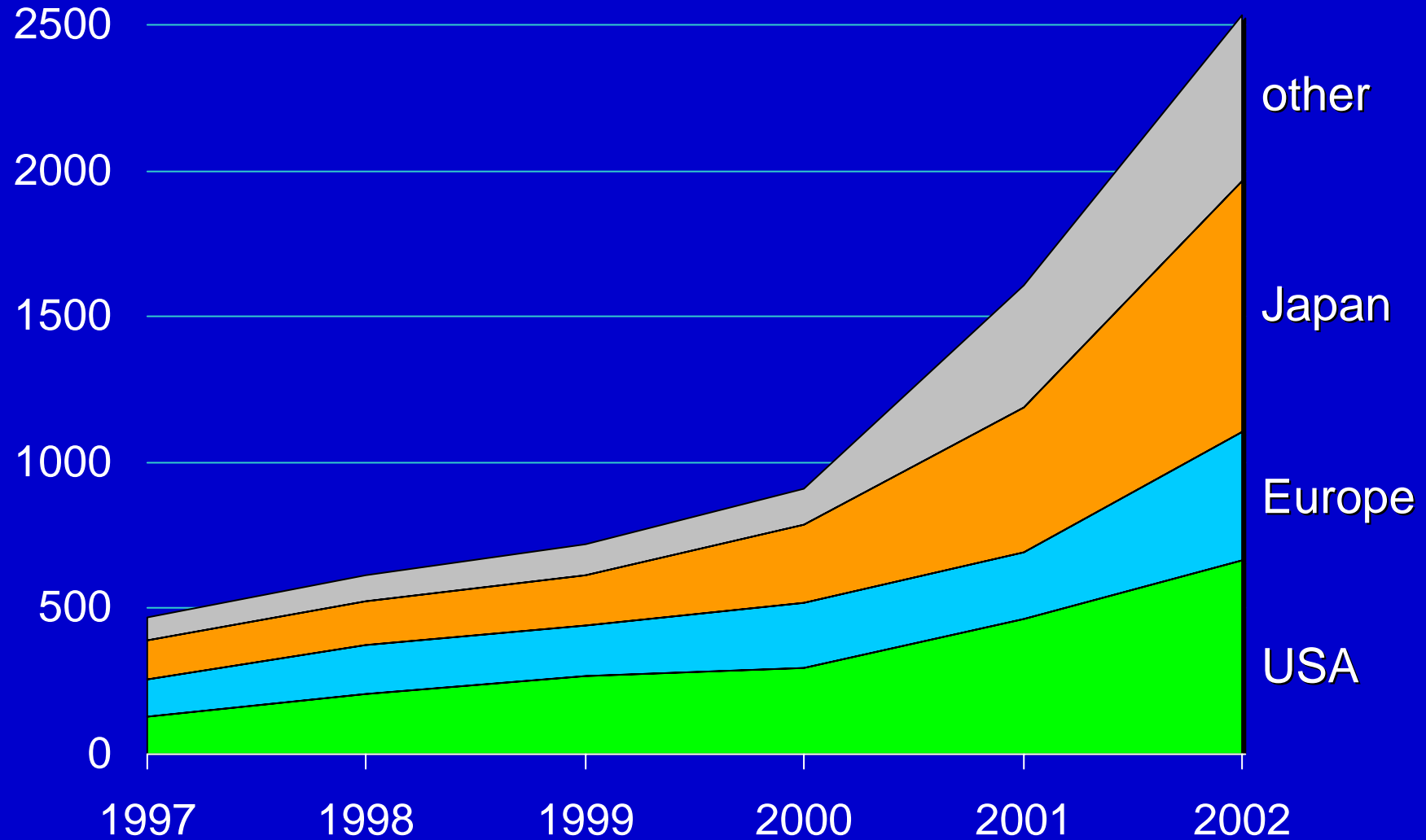


Fig. 2

Geographical distribution of nanocompetence

Most frequent mentions

	USA	Europe	Asia
Structuring			
Electronics			
Materials			
Chemicals			
Medicine/ pharmaceuticals			

World market for nano/nanomodified products

Sales in billion €

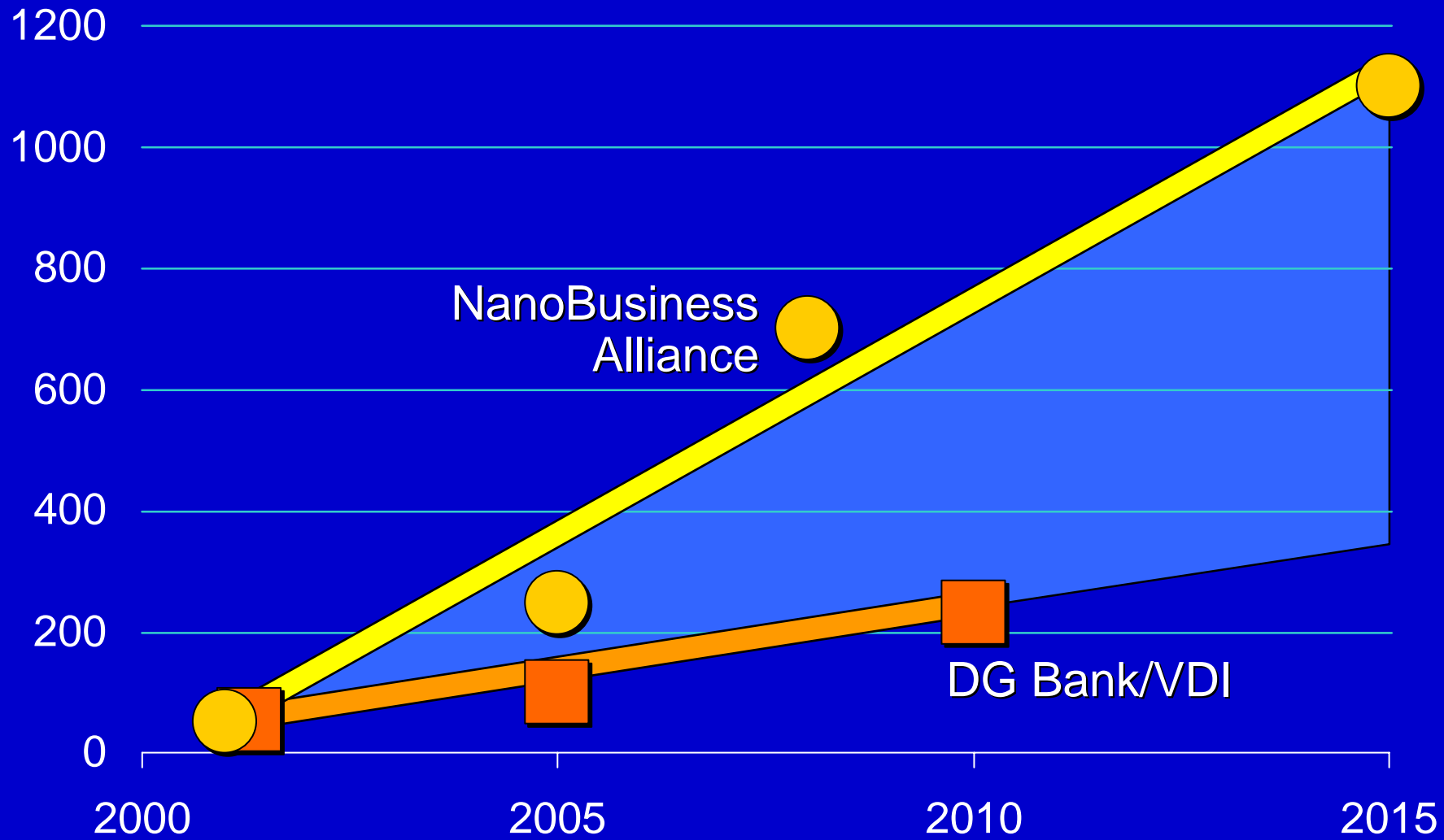
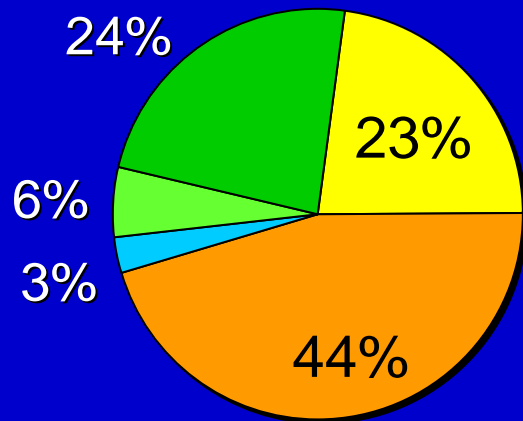


Fig. 4

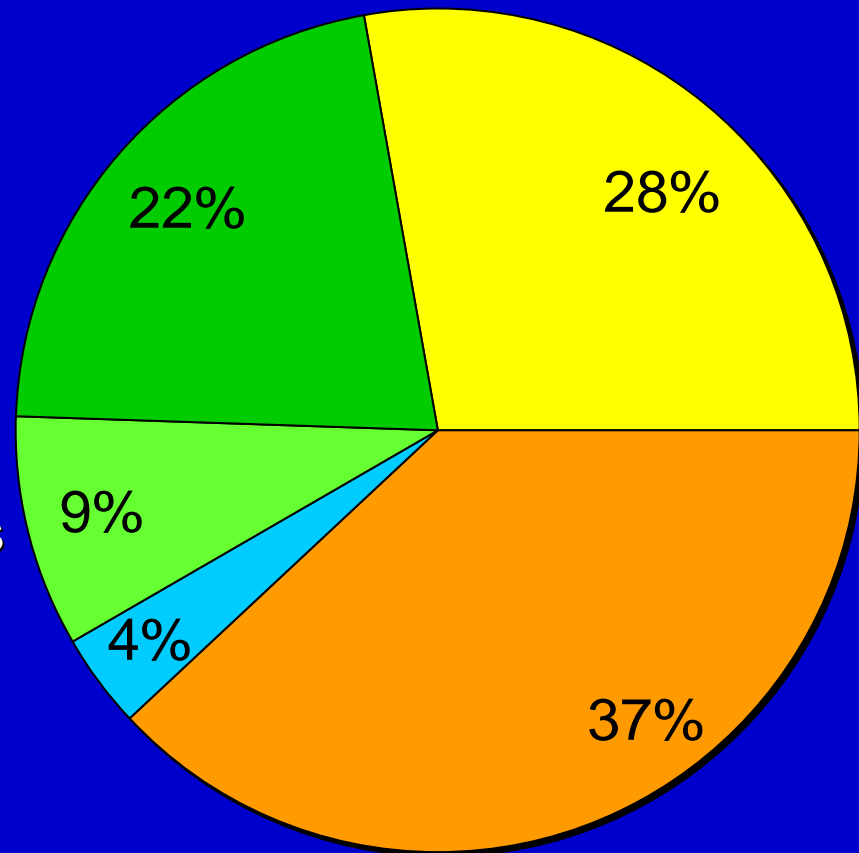
Nanotechnology activities

World market volume in percent

2001: €54 billion



2010: €220 billion



- Nanoparticles and nanocomposites
- Ultrathin layers
- Measurement and analysis of nanostructures
- Ultra-precise surface processing
- Lateral nanostructures

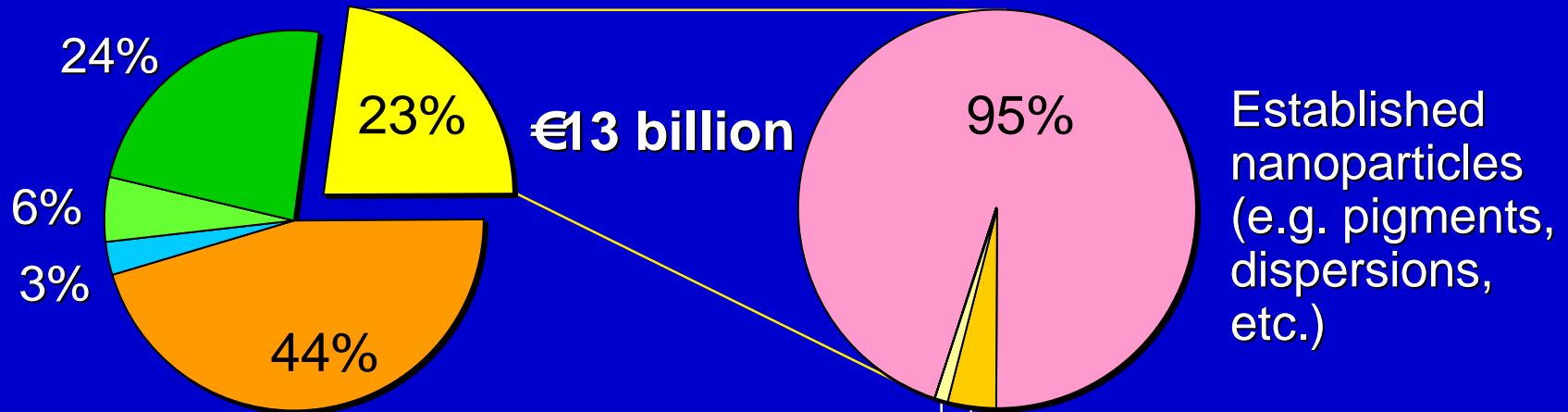
Source: DG Bank

Fig. 5

Nanotechnology activities

World market volume

2001: €54 billion



- Nanoparticles and nanocomposites
- Ultrathin layers
- Measurement and analysis of nanostructures
- Ultra-precise surface processing
- Lateral nanostructures

Nanoparticles, properties

Surface proportion [%]

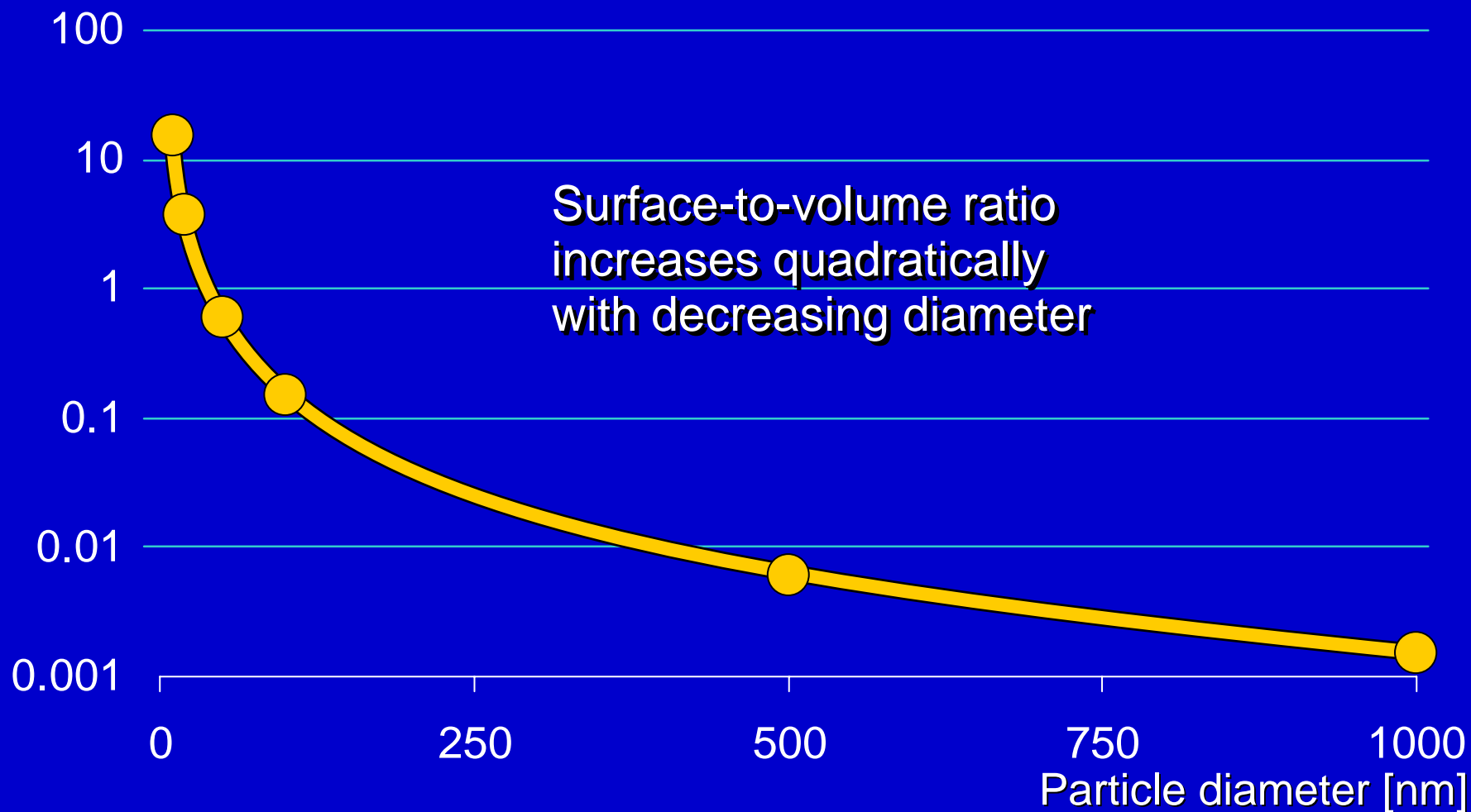
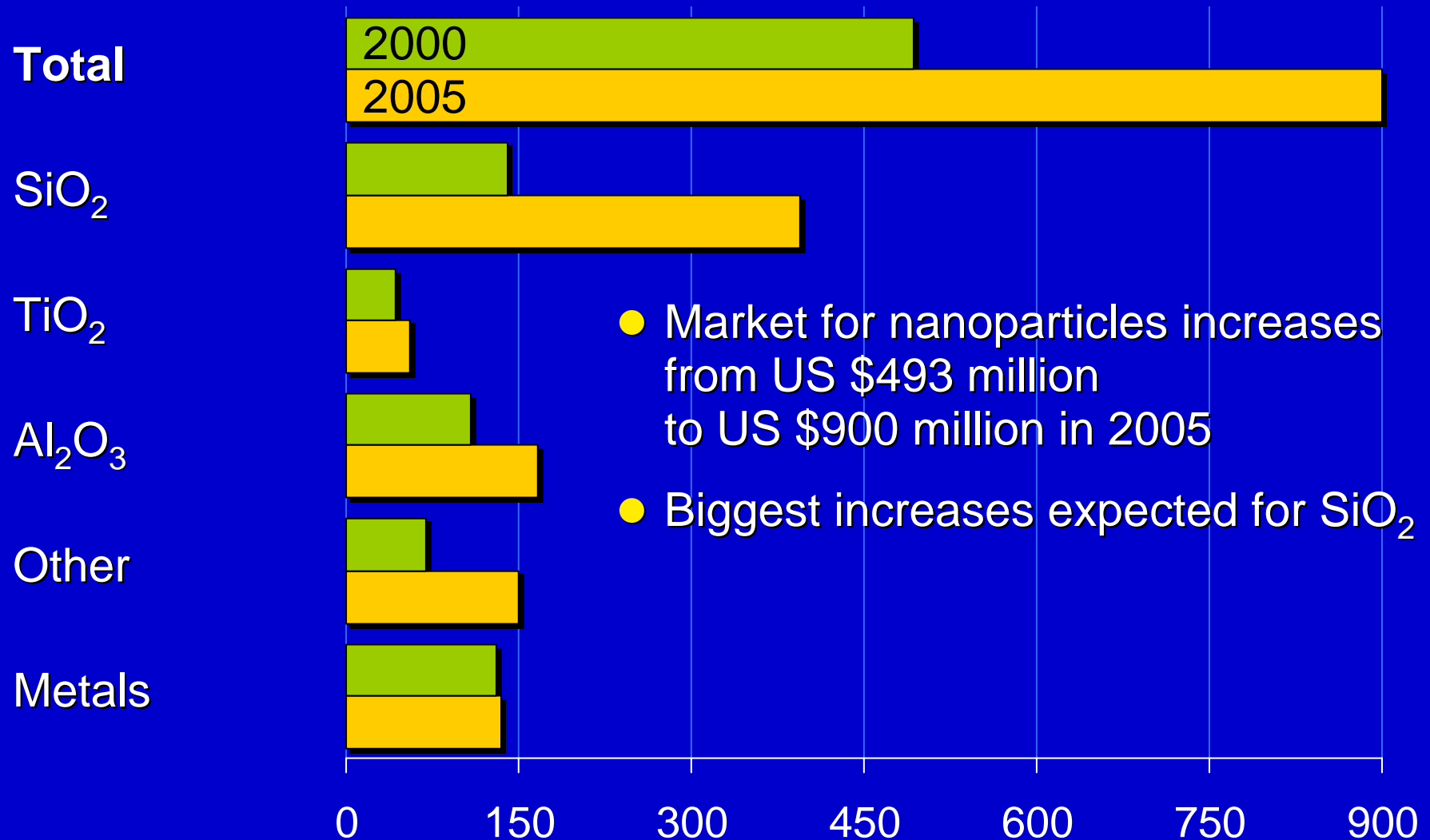


Fig. 7

Nanoparticles, market

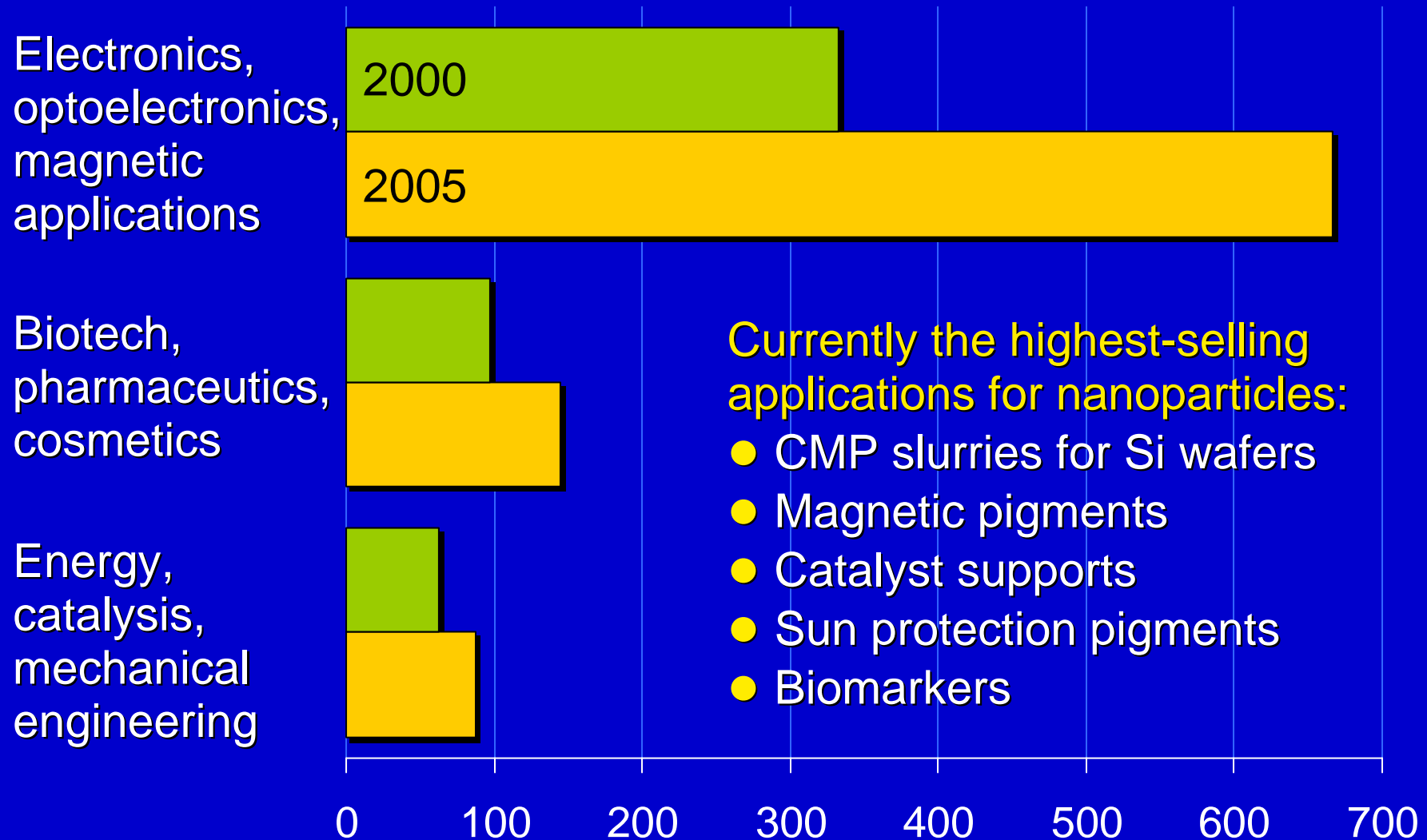
Million US \$



- Market for nanoparticles increases from US \$493 million to US \$900 million in 2005
- Biggest increases expected for SiO₂

Nanoparticles, applications

Million US \$



Currently the highest-selling applications for nanoparticles:

- CMP slurries for Si wafers
- Magnetic pigments
- Catalyst supports
- Sun protection pigments
- Biomarkers

Nanocomposites

Advantages of nanofillers

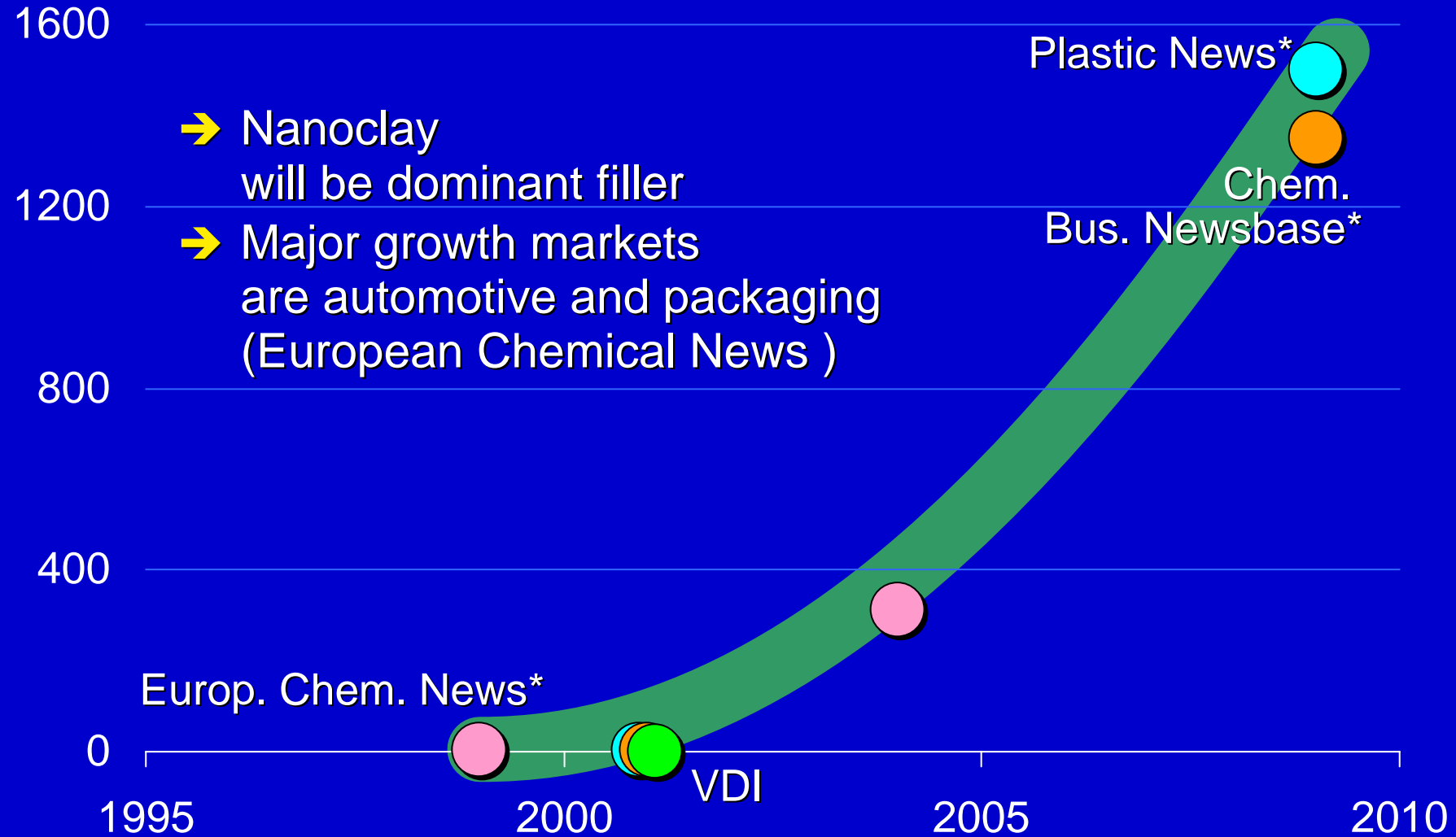
- Improved mechanical properties
- Better diffusion-barrier characteristics
- Better processability
- Better transparency
- Electrical conductivity
- Better burning behavior
- Better surface properties

Disadvantages

- Difficult compounding
 - Brittleness
 - Inadequate cost/performance ratio
-

Plastic nanocomposites, market

Sales in billion €



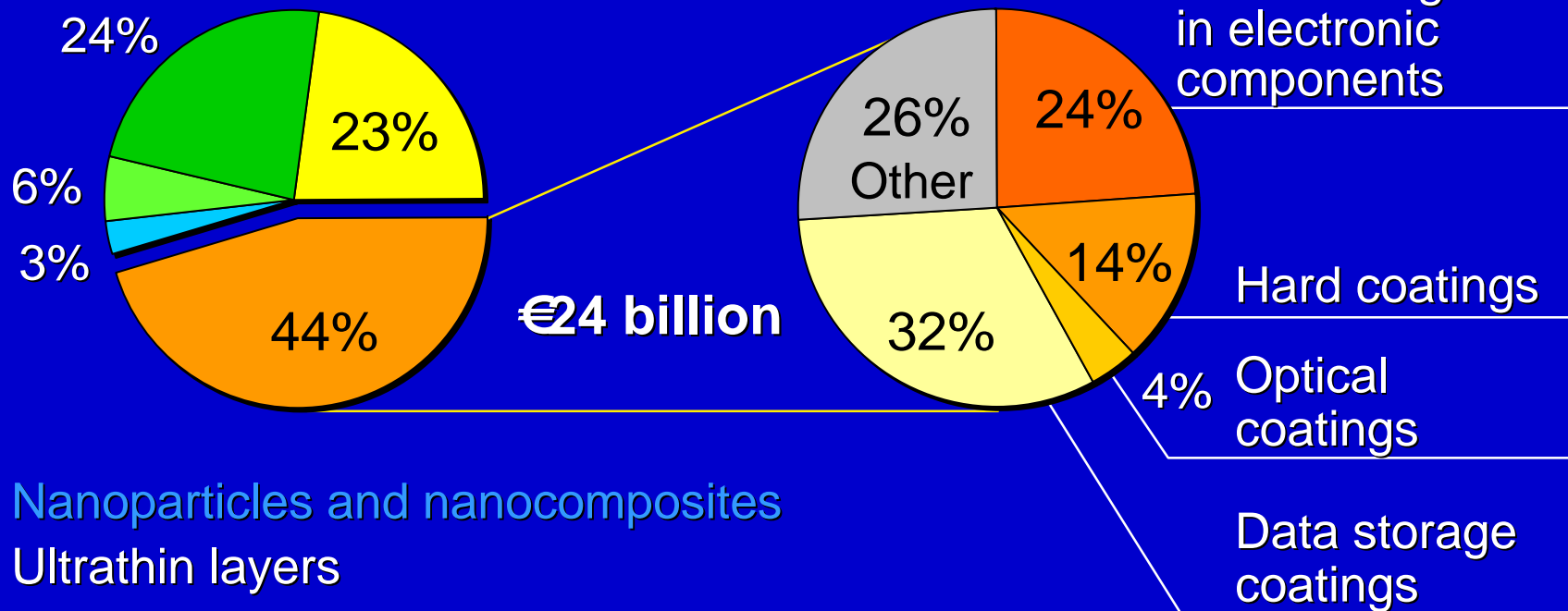
* Assumption: 3,000 €/t

Fig. 11

Nanotechnology activities

World market volume

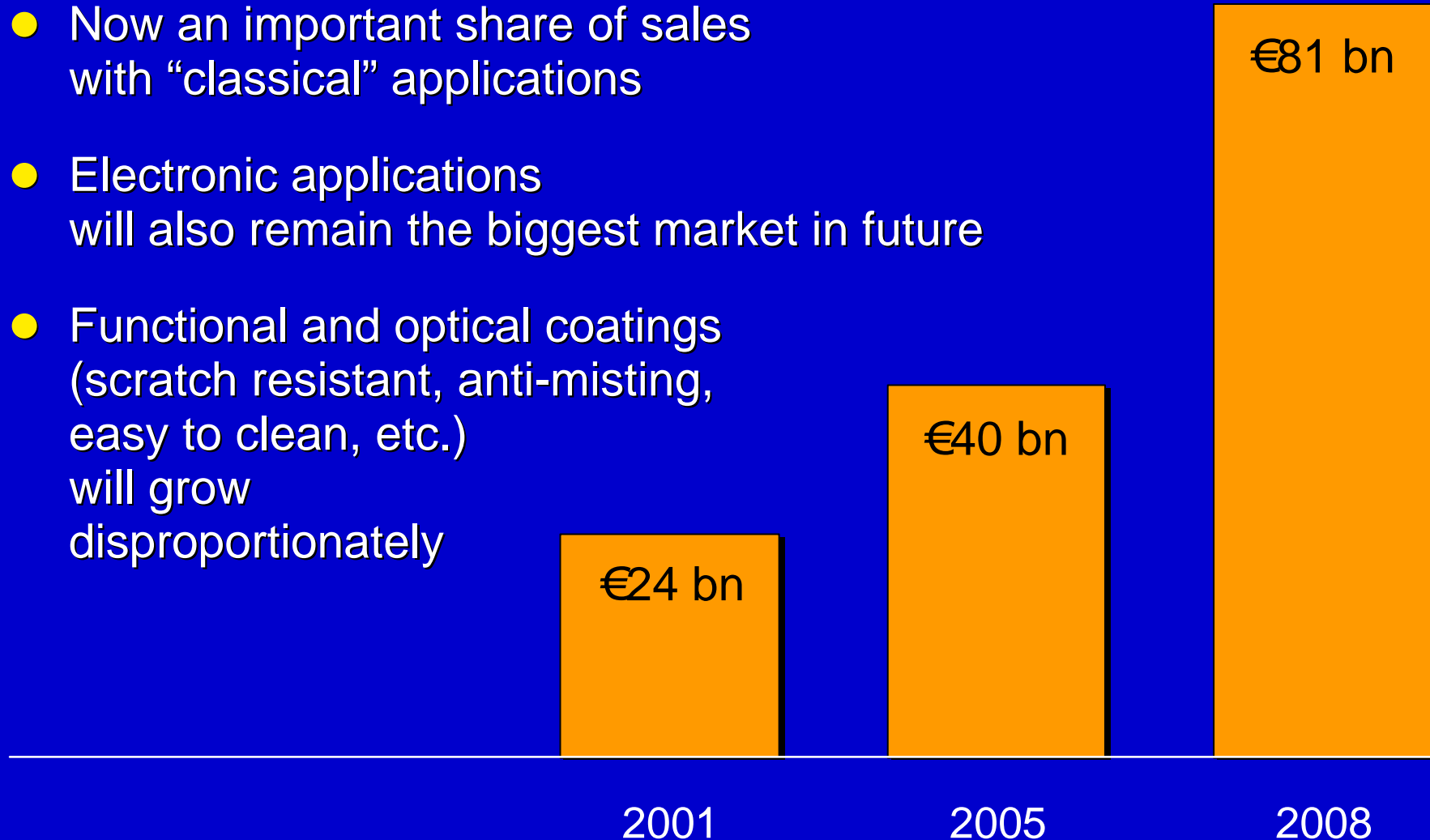
2001: €54 billion



- Nanoparticles and nanocomposites
- Ultrathin layers
- Measurement and analysis of nanostructures
- Ultra-precise surface processing
- Lateral nanostructures

Market for coatings

- Now an important share of sales with “classical” applications
- Electronic applications will also remain the biggest market in future
- Functional and optical coatings (scratch resistant, anti-misting, easy to clean, etc.) will grow disproportionately



Source: DG Bank

Fig. 13