Rare Earth Systems
The leader in rare earth value chain

DU, Hua
General Manager,
Rare Earth Systems
AGENDA

1. Our positioning and strengths
2. Our strategy
3. Our growth ambition
1. Our positioning and strengths
Our Positioning and Strengths

Rare Earth Systems at a glance

2011 Net Sales
> € 500m

Employees
> 1000

# 1 in rare earth based specialty chemicals

Sales, R&D and industrial footprint close to our target markets and target customers

A unique global footprint

Europe
26% of sales

Asia
46% of sales

North & Latin America
28% of sales

Manufacturing sites
R&D Centers
Sales office
OUR POSITIONING AND STRENGTHS

Differentiated positioning in the rare earth value chain

MINING  CONCENTRATION  SEPARATION  FORMULATION  APPLICATION MARKETS  RECYCLING

RARE EARTH SYSTEMS

Rare Earth Concentrates

Light Rare Earth
La, Ce, Nd, Pr, ...

Heavy Rare Earth
Dy, Tb, Eu, ...

Rare Earth oxide formulation

APPLICATION MARKETS

Automotive Catalysis
Semiconductor CMP
Electronic polishing
Lighting

Capital Markets Day 2012
Our Positioning and Strengths

Covering the widest range of applications

**Key Products**

**Automotive Catalyst**
- Gasoline
  - Mixed oxides: Actalys®, Optalys®
  - Alumina: Stabylis®
- Diesel
  - Additives: Eolys®, Powerflex®
  - Mixed oxides: HSA®, Actalys®, Optalys®
  - Alumina: Stabylis®
- Chemcat
  - Precursor: Nd Versatate and Phosphates

**Electronics**
- Lighting
  - Phosphors Precursor: Luminostar®, Morningstar®
- High End Polishing
  - LCD, Glass Hard Disk, Photomask
  - Cerium oxides: Cerox®
- Semiconductor CMP
  - High Purity Cerium: HPCC
  - Colloidal Cerium
- eCeramic
  - Dy & Y oxides: Superamic®
- Medical Devices
  - High purity rare earth oxides
- Environmental Friendly Pigments
  - Cerium derivatives: Neolor®
- Nuclear Energy
  - High purity rare earth oxides

**Recycling & Separation**
- Recycling of Phosphors powders
- Recycling of Permanent Magnets
- Heavy Rare Earth Separation
Our positioning and strengths

2011, an outstanding year capitalizing on our unique positioning

2008 - 2011 REBITDA

2011, an exceptional year
- Drastic reduction of China export quotas mid 2010
- Unprecedented raw materials price increases

2011 Business achievements
- Managed and enhanced security of supply to our customers
- Reshaped business portfolio focusing on specialty high-added value segments
- Gained significant market share
- Enhanced global footprint
2. Our strategy
OUR STRATEGY

Leveraging our unique compelling positioning

Combining our four differentiated key pillars

Security of supply

Industrial expertise

Technology innovation

Global footprint
**OUR STRATEGY**

Sourcing diversification strategy to secure supply

Currently

**Enjoying access to**

Export quotas

Key players in China

Over 95% of Rare Earth production sourced from China

Going forward

**LIGHT RARE EARTH**

- Strategic agreement with LYNAS
- 2nd strategic agreement out of China will be closed in 2012

**HEAVY RARE EARTH (HRE)**

- Strategic agreement with CHINALCO
- Actively assessing new HRE mining options out of China
OUR STRATEGY

Enhancing leadership position in automotive catalysis market

Light Vehicles Gasoline and Diesel Car Production
(Million units)

MARKET DRIVERS
More demanding emission control regulations
Car production volume in China

Mixed oxides market evolution
(Tonnes)

2011 Market Share > 35%
Mixed oxides production start-up in China : 2012

2016 Strategy
• Leverage high performance products and strong IP portfolio
• Global production footprint to support our global customers
• Asia, NA and EU R&D labs close to our customers development centers

Sources : JD Power, Internal analysis

Capital Markets Day 2012
MARKET DRIVERS

Energy saving regulations
Replacement of halophosphates lamps
Recycling is key market trend

LFL Phosphors precursor overseas market (Tonnes)

+6% CAGR

2011 Market Share > 20%

2016 Strategy

- Groundbreaking Morningstar® technology innovation reducing terbium consumption

- Unique Phosphors powders Recycling process

- Security of supply with our dual supply chain

Sources: Freedonia, Strategies unlimited, Internal analysis
**Our Strategy**

Building leadership in semiconductor Chemical Mechanical Planarization (CMP)

**MARKET DRIVERS**

- **Consumption** of mobile devices & Miniaturization
- Increasing **needs in memories and logics**
- Strong **regional dynamics** in Korea and Japan

**Specialty Ce market evolution**

(Tonnes)

+8% CAGR

- **Produced wafer surface** (8-Inch equivalents, x 1,000)

+7% CAGR

2011 Market Share > 40%

Cerium is the next generation technology compared to Silica

**2016 Strategy**

- Leverage groundbreaking Colloidal Cerium innovation and strong IP portfolio to drive business growth in Asia (namely Japan and Korea)
- Security of supply and high end manufacturing facilities for targeted customers

Sources: Gartner, Internal analysis
Leading rare earth recycling in selected market segments

Recycling initiatives

LINEAR and COMPACT FLUORESCENT LAMPS
New recycling business starting in 2012 in France

PERMANENT MAGNETS

NICKEL METAL HYBRID BATTERIES
Long track record in rare earth industry

Expertise in ore processing
Monazite, Xenotime, Apatite, Bastnasite, and Ionic ores (Soda, Chloride, Nitrate and Sulfuric routes)

Expertise in rare earths separation
RES is the only player mastering the separation process with Nitrate and Chloride route. We have unique industrial footprint with separation assets in France and in China.

Industrial expertise and know-how, valued by mining companies allow us to develop upcoming heavy rare earths separation business

As from 2013, Rare earths separation batteries in La Rochelle (France)
3. Our growth ambition
OUR GROWTH AMBITION

Committed to outperform market growth

- Recognized specialty chemical leader in the rare earth value chain
- Differentiated strengths in technology innovation, industrial expertise, global footprint and security of supply
- Strong business portfolio in high-tech high growth markets of Automotive Catalysis and Lighting & Electronics
- Moving aggressively in Recycling and Heavy Rare Earth separation

2010 - 2016 EBITDA

Exceptional Pricing conditions

> 20% CAGR
Where do the rare earths stand in the Mendeleiev table?
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