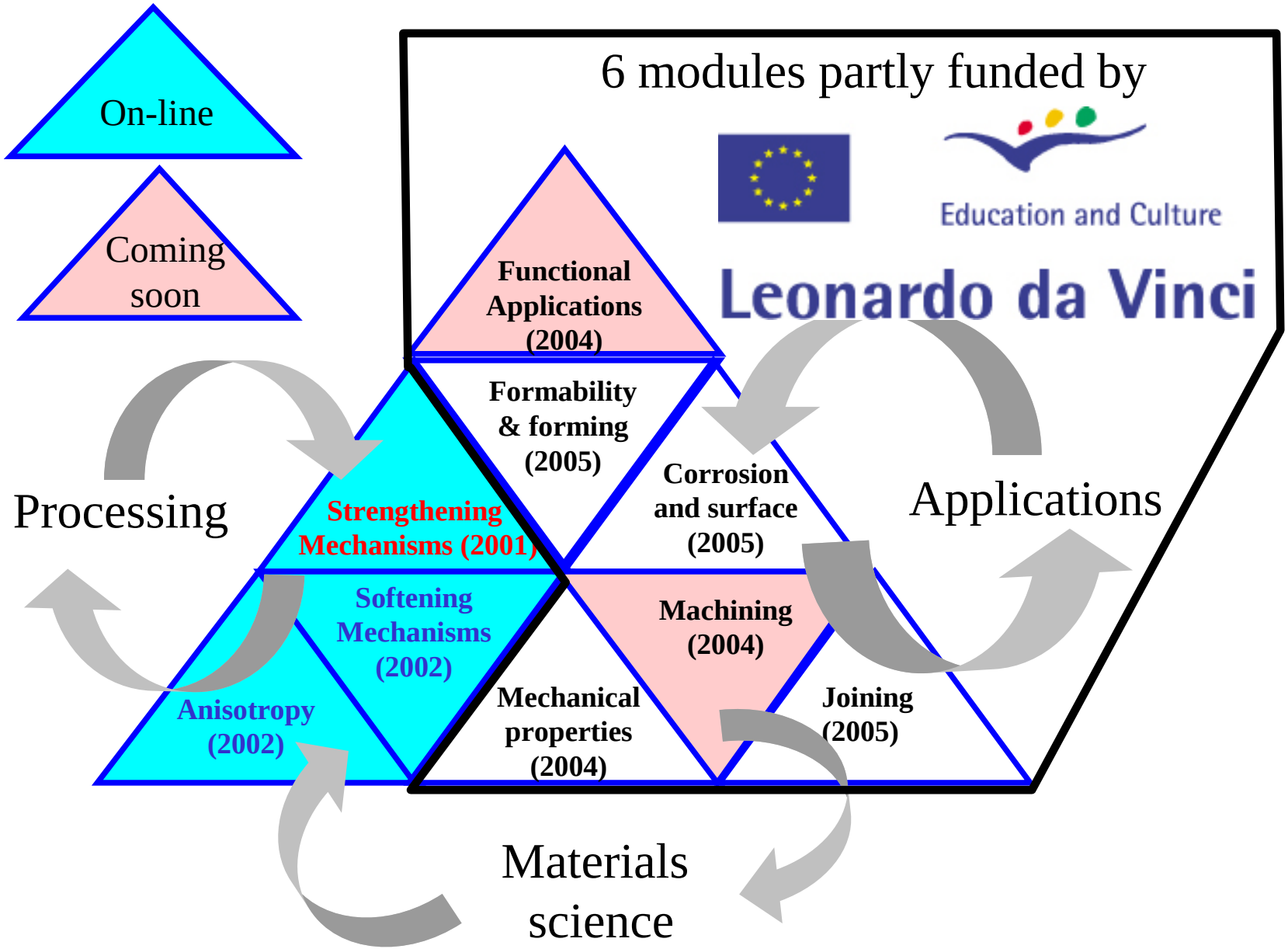
When aluminium science and technology become recre@ting

What is aluMATTER?

- Modular interactive and innovative web-based learning resources about **aluminium materials science and technologies**.
- Used as distant **self-learning material** and **complementary learning material** in vocational training programs and in higher education.
- A package of **9 modules** covering the main aspects of aluminium materials science and fabrication technologies will be completed within the next 2 years.

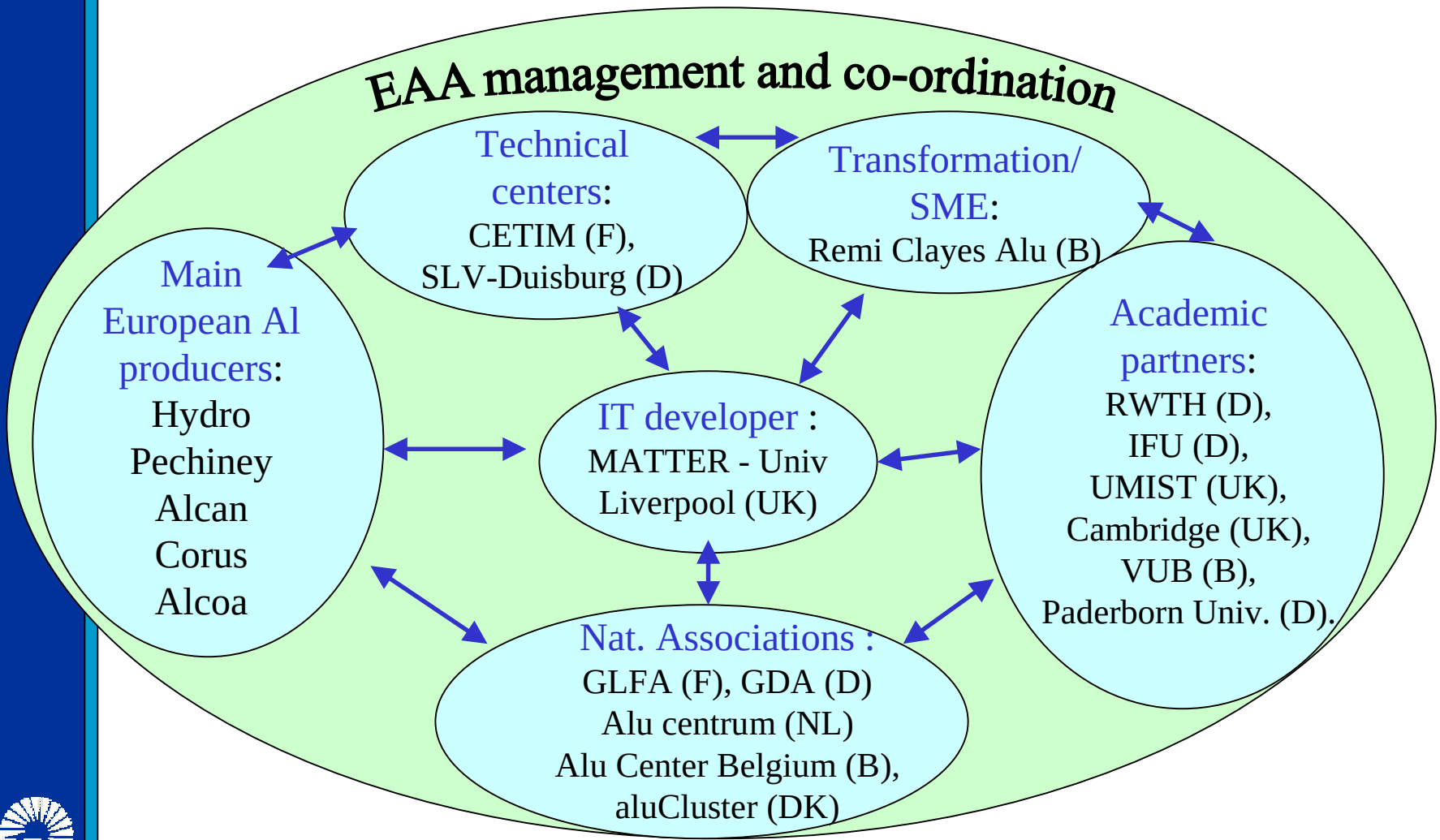
9 modules & 3 entry points



Leonardo da Vinci project 2003-2005

- Budget of 1 M€ on 3- years covered for about 50% by the European Commission
- The European Aluminium Industry thanks the European Commission for this leonardo da Vinci funding
- **Why a Leonardo funding?**
  - Expertise in fabrication technology often outside the Aluminium Industry (Technical centers, University, etc.)
  - Needs for establishing a large network for proper development, translation and dissemination towards students and SME's
  - Establishing a well-balanced partnership

Consortium of 21 partners



How is it developed?

- Small expert working groups (Industrial experts and Academics) in charge of storyboarding
- Storyboards developed under guidance and supervision of the MATTER group who is in charge of the programming and encoding work
  (see http://www.matter.org.uk)

- MATTER = leading providers of computer- and web-based learning software for materials science, engineering and related disciplines.
- Primarily developed in English, but provision is already made to translate into French, German and Dutch.

What behind a module?

- Each module composed of
  - about 80-100 computer screens
  - including learning outcomes, pre-requisites, interactive animations, multiple-choice questions, virtual experiments and simulations
  - corresponding to about 6-8 hours of traditional lessons
- Web structure designed to allow the content to be accessed via three entry points:
  - Products/applications,
  - Materials Science
  - Processing

aluMATTER homepage

HOME | SITE CONTENTS | SEARCH | ALUSELECT | MEMBERS' AREA | ABOUT ALUMATTER | HELP

aluMATTER

Page 1 of 1

Home Page

SUB-TOPICS:

Applications
Processing
Materials Science

Send feedback to EAA

Welcome to **aluMATTER** - a freely-accessible website that aims to provide **innovative** and **interactive** e-learning tools for aluminium science and technology.

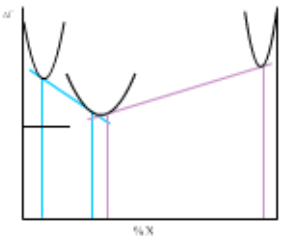
FREE Searchable Database

The site currently contains three 'modules' covering some of the more fundamental aspects of aluminium metallurgy:

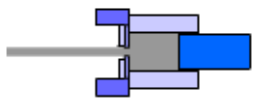
- Strengthening Mechanisms
- Softening Mechanisms NEW
- Anisotropy NEW

In 2002, aluMATTER successfully bid for funding from the Leonardo da Vinci programme of the European Union to develop a further 6 modules: "Mechanical Properties", "Functional Applications", "Machining", "Forming", "Joining" and "Corrosion & Surface Properties".

Browse by Applications



Browse by Materials Science



Browse by Processing

aluMATTER is being developed as a partnership between the European Aluminium Association, Education and Training Committee and the MATTER Project at the University of Liverpool.

Typical screen example

Up level

SEE ALSO:

3xxx Series

5xxx Series

Architectural Sheet

Effect of Alloying on Work Hardening Rate

Structural Sheet

Send feedback to EAA

Page 2 of 6

Section Contents...

Solute Hardening Overview

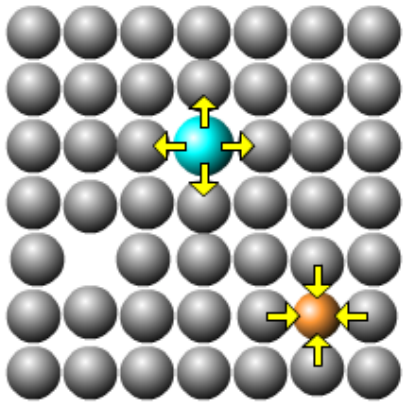
The substitution of aluminium by solute atoms results in lattice distortions and a local increase in the energy of the crystal lattice.

Dislocations passing through such regions also experience an increase in energy, and hence additional work must be done to move them – i.e. the yield stress of the metal increases.

For successful strengthening, alloy additions must satisfy 2 criteria:

1. high RT solid solubility;
2. atomic misfit to create local compressive or tensile strains.

Drag the foreign atoms onto Al atoms in the lattice and note the strain effects.



Reset

Example of a virtual experiment: hardness testing

Introduction

In this experiment, you are going to check the validity of the Hall-Petch relationship for an Al-4.5%Mg alloy.

$$\sigma_y = \sigma_0 + kd^{-1/2}$$

Firstly we need to prepare samples with a range of different grain sizes, d. We'll do this by deforming (rolling) a plate by different amounts, cutting samples at each stage. We'll then anneal the samples to fully recrytallise them. Heavily deformed samples should recrystallise to give a finer grain size.

After measuring the grain sizes, you will do Vickers hardness measurements on each, and convert hardness to yield stress, σ_y values.

By plotting σ_y versus $d^{-1/2}$, we should expect to obtain a straight line of gradient k and intercept σ_0.

Before starting, copy or print out the datasheet below. Then click on the forward arrow to proceed.

If you would like to enjoy aluMATTER, please visit:

www.aluminium.org/education

or

www.alumatter.info

For any additional information:

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