5．プレゼンテーション資料（エジプト側）

5－1　Egypt-Japan University for Science and Technology

# Egypt-Japan University for Science Technology (E- JUST)

**Proposed Under graduate Educational Programs:**

**Faculty of Engineering:**

1. Bachelor in Electronics and Communication Engineering.
2. Bachelor in Industrial and Management System Engineering.
3. Bachelor in Mechatronics and Robotics Engineering.
4. Bachelor in Chemical and Petrochemical Engineering.

**Faculty of International Business and Humanities:**

5. Bachelor in Japanology and Cross-Cultural Management

## Proposed Centers of Excellence:

- **Nano- Engineering Research Center**
- **Energy Resources and Management Research Center**
- **Mechatronics Research Center**

Egypt-Japan University for Science & Technology (E-JUST)

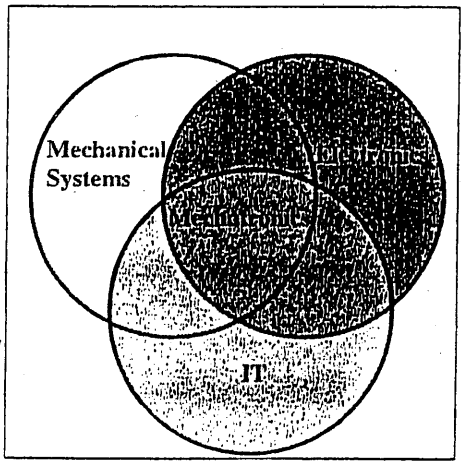
# Mechatronics and Robotics Engineering

## MECHATRONICS ENGINEER OF THE FUTURE

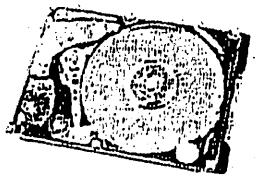
*The mechatronic engineer of the future is the rare individual who is able to work across the boundaries of constituent disciplines to identify and use the right combination and integration of technologies which will provide the optimum solution to the problem in hand. He/she should also be a good communicator who is able work in and lead a design team which may consist of specialist engineers as well as generalists.*

# What is Mechatronics?

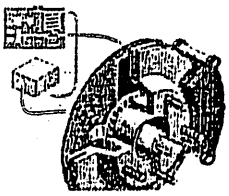
*"The synergistic integration of precision machinery, electronics, control, and information technology in the design of products and systems."*



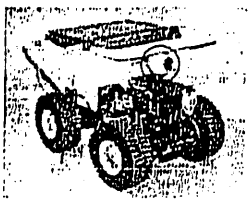
# Examples of Mechatronic Products



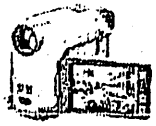
Hard disk drive



Anti-lock Braking System (ABS)



Mobil Robot



Camcorder

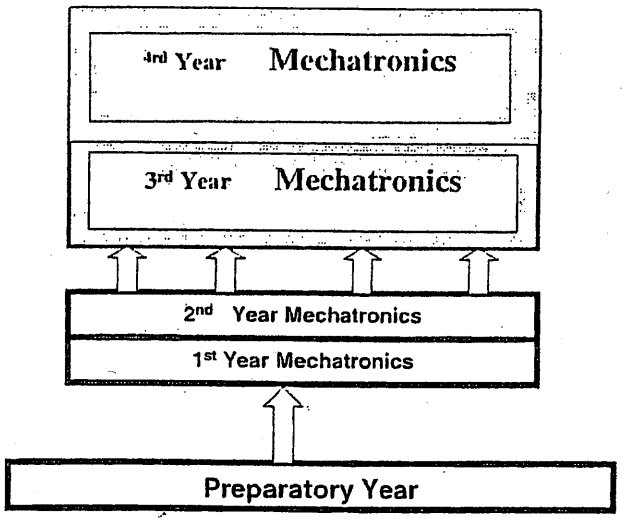
## Why Teaching Mechatronics at E-JUST

- Due to revolution in microelectronics and computer science of the last decades, pure mechanical/electrical products almost do not exist any more!
- As realized during training programs and consultation in various industrial companies in Egypt, the problems being faced by engineers after they graduate are increasingly interdisciplinary and complex.
- It is extremely important that young engineers are educated in order to be comfortable working in and across many different domains.

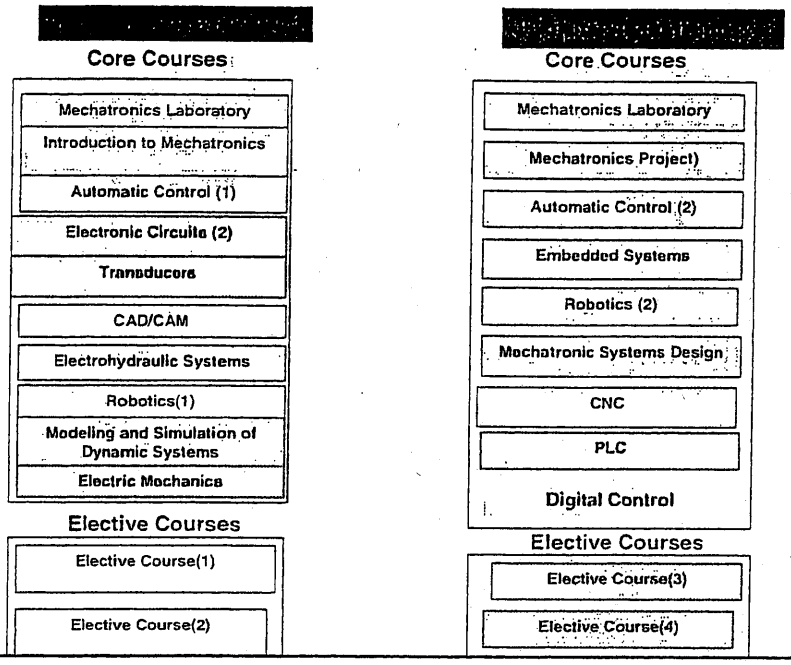
# Mission of Mechatronics Program at E-JUST

- Prepare future multidisciplinary engineers to meet the demands for an engineering workforce equipped with information technology, embedded systems and precision mechanical systems.
- Provide the students with multidisciplinary capabilities to design products by integrating mechanical, electronics and information technology.
- Prepare qualified students who can apply latest manufacturing techniques to improve products quality and enhance the system performance.
- Improve the student's practical skills .

# Mechatronics Program



# Mechatronics Program




# Introduction to Mechatronics

Objectives:

- Introduce the student to mechatronics by giving him a brief overview of the subjects.
- Familiarize the students with the tools of modeling and simulation of mechatronic systems.
- Familiarize the students with the integration of the basic components of Mechatronic systems.
- Enhance the students' skills in practicing mechatronics through several practical examples.

## Mechatronic Systems Design

Objectives:

- Introduce the students to basic philosophy and approaches of mechatronic design and how it differs from the traditional design approaches.
- Introduce the students to software tools useful for Mechatronic design.
- Introduce students to intelligent systems in Mechatronics.
- Enhance the skills of the students practicing Mechatronics through conceptual design projects that give them the ability to work in a team.

## Mechatronics Projects

Objectives:

- To provide students with an opportunity to perform a real-life engineering project.
- To develop and improve students' teamwork, time management, professional presentation, and engineering report writing skills.
- To develop understanding and basic knowledge of critical analysis and problem solving strategies.
- To provide students with the opportunity to experience peer reviewed oral presentations.
- To provide students with the opportunity to further develop their ability to graphically communicate ideas and designs using sketches and drawings and fellow standard references convention.

# Mechatronics Laboratory

Objectives:

- Reinforce the lecture material through application to practical problems and systems.
- Training students on report writing and data presentation.
- Allow the student to gain competence in the use of typical development tools.
- Develop an understanding of the behavior of the devices used.
- Gain experience in finding and applying information from products data sheets
- Learn how to prototype and test circuits and systems.
- Develop the debugging skills, both hardware and software, necessary to successfully run experiments.

# Energy Resources and Management Research Center

- Energy management and conservation in all industrial, commercial as well as domestic sectors represent one of the most important activities that have vital impact on the state development and standard of living. Reserves of petrol and natural gas are limited; therefore efforts should first orient towards the conservation of consumption of the available resources and development of technologies that satisfy this target.
- The main target of this center is to integrate the efforts and achievements of national experts making use of the Japanese know how to follow a specific strategy which focuses on the researches which deal with applied topics in areas where there is a real need for development either in industry or in community services. In general the center will follow the guidelines of the national strategy of scientific research.

- New renewable non-polluting resources are being brought increasingly into play and their incorporation into the energy system presents some challenging problems. The intense global awareness of energy-related environmental problems opened up avenues for challenging problems.
- There is an immediate need to the practice of power generation, transmission, distribution and utilization taking into account some of the techniques that have evolved in the light current field and applying them in large-scale systems. The use of computers has made a vast difference to the control of energy systems.

<u>The center main activities will cover the following topics:</u>

- Energy conservation ( both electrical and thermal energy) in industry sector.
- Energy management applying intelligent control policies and information technology.
- Building conserving energy – intelligent architecture
- Proper building materials in rural areas, innovations of materials satisfy comfort conditions in buildings.
- Impact of energy projects and large building compounds on environment.
- Waste utilization and recirculation.
- Economic use of energy and materials for sustainable development
- Modeling and simulation of thermal comfort in building and energy economics

- Generation Planning related to the future expansion of generation and transmission capability to meet expected demand growth is pursued to determine the optimum kind, size and location of generator units subject to reliability, size limit, fuel, environmental or political constraints.
- Transmission Planning determines when, where and what kind of transmission lines should be built to provide reliable service between generators and consumers.
- Expansion of Transmission Systems to meet a future growth that would be faced by a dilemma. Is it preferable to increase the number of large power plants located remotely from load centers or to build a large number of power plants near the load centers with the possibility of using total energy schemes?

- The first solution requires expansion of transmission system with the related problems of rights-of-way and visual pollution. The second solution is attractive if the capital cost of the total energy scheme and the more emission control from chimneys are not expensive.
- Security Constrained Optimization action including starting up of new generating units, load shedding transformer tap changing and reactive power adjustments.
- Computer-Man Interface Enhancement through the use of graphic c.r.t. terminals for introducing information to the energy systems.

- Load Forecasting: Because of the absence of storage capability of electric energy and the long time lags involved in loading thermal plant, it is essential that the consumer demand is forecasted well in advance in order to prepare and load a generating plant.
- Renewable Energy Sources are more suitable to decentralized applications, e.g. solar and wind energy while others are more suitable to large-scale exploitation, e.g. tidal and wave energy. Assessment of the pros and cons of centralized energy system of the effective exploitation of renewable energy sconces is due.
- Power Electronics and their integration in energy system control and protection.
- Microwave applications and their integration in energy system protection.

# Mechatronics and Robotics Research Center

## Propose research Areas:

Robotics Applications

- Intelligent control of flexible robot
- Smart grippers.
- Tactile sensing system for Tele robotic Applications.
- Guided Vehicles
- Autonomous Mobile Robot.

## Medical Applications

- Mechatronic haptic display system for virtual surgery simulators.
- Tactile Sensing System for Surgical applications.
- Image Guided Robot Surgery.

## Industrial Applications

- Intelligent Actuators/sensors.
- Automotive Engineering (ABS).
- Active Magnetic Bearing (AMB).
- Real-Time Optical Measurement systems.

## Thank You for Your Attention

# EJUST
# Electronics & Communications Engineering Curriculum

**Hisham Haddara**

1 2006/4/10 EJUST

## Vision

- ☐ To educate students to identify, formulate and solve electronics and communication engineering problems related to the industry and the environment
- ☐ To provide students with a solid background in electronics and communication engineering, mathematics, science and computer software and hardware
- ☐ To teach students industrial practices through hands-on training at industrial sites
- ☐ To teach students professional and ethical responsibility

2 2006/4/10 EJUST

## Undergraduate Curriculum

- Three stages
  - First two years : Emphasis on foundational subjects such as mathematics, basic sciences, electronics and computer engineering fundamentals
  - Second two years : Focus on advanced electronics and communication engineering topics such as communication and information theory, electromagnetic fields and waves, electron devices, electronic circuits, computer fundamentals, basics of VLSI technology and design
  - Last year : Specialization year through program split or elective courses. Two primary areas of focus :
    - Communication systems
    - VLSI systems and design



## Industrial Training

- Embedded into curriculum
  - Optional during the first phase
  - Obligatory during the second and last phases
- Focus on
  - Hands on training
  - Industrial practices and procedures
  - Professional and ethical responsibility

## Graduate Studies : Objective

- To create a foundation for R&D excellence in areas of current and future interest to the local and international communities
  - Wireless sensing and wireless sensor networks
  - Advanced wireless communication systems
  - MEMS sensors



## Graduate Studies

- Areas of Specialization
  - Design of VLSI systems
  - Communication systems
  - MEMS and Nano-electronics
- Areas of research
  - Wireless sensor networks
  - Future communications systems (DVB-H, 4G wireless telephony, etc.)
  - Biosensors

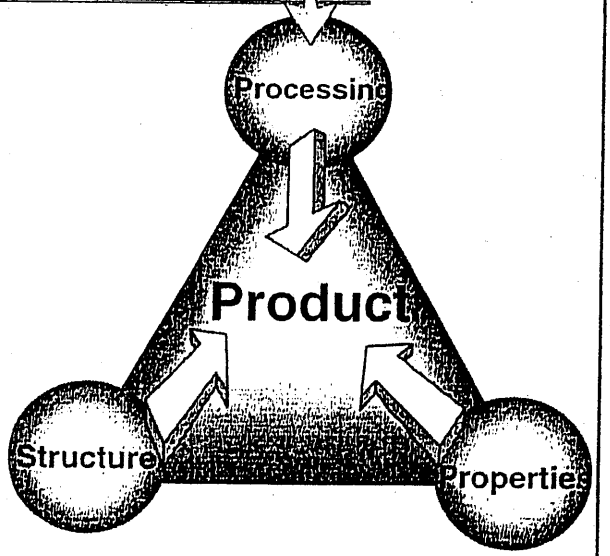
E - JUST

# Advanced Materials Proposed for Study Program at the Graduated Level

M. Sherif El-Eskandarany
Professor of Materials Science Engineering

## Advanced Materials

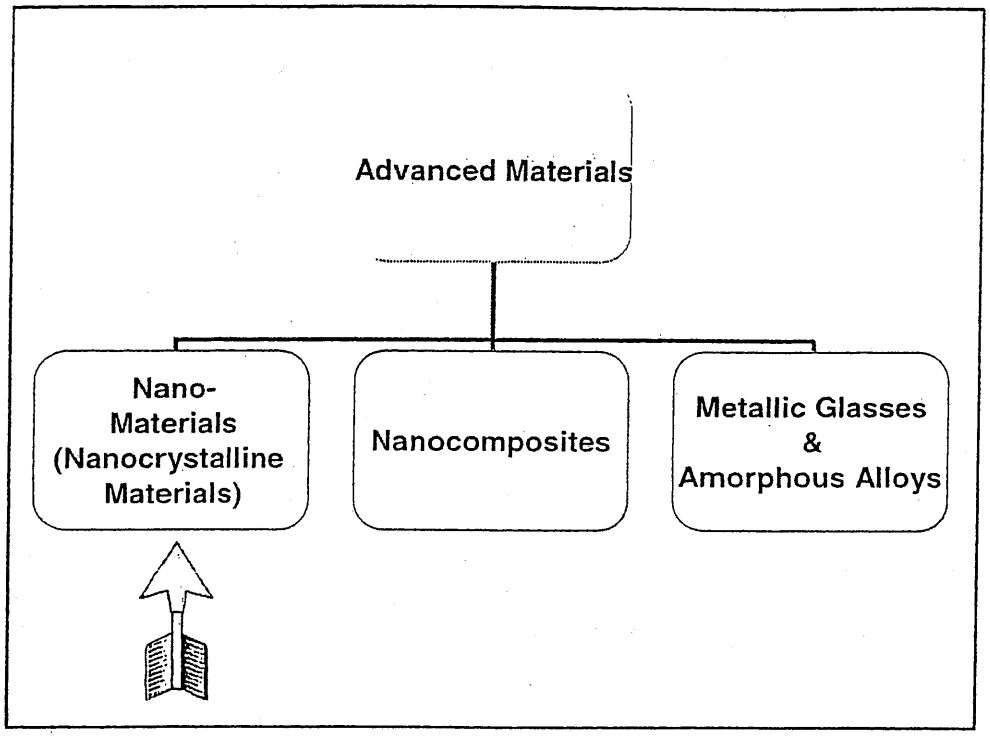
*Advanced materials are those materials which are employed in high-technology applications. These advanced materials are typically either traditional materials whose properties have been enhanced or they are newly developed, high-performance materials.*

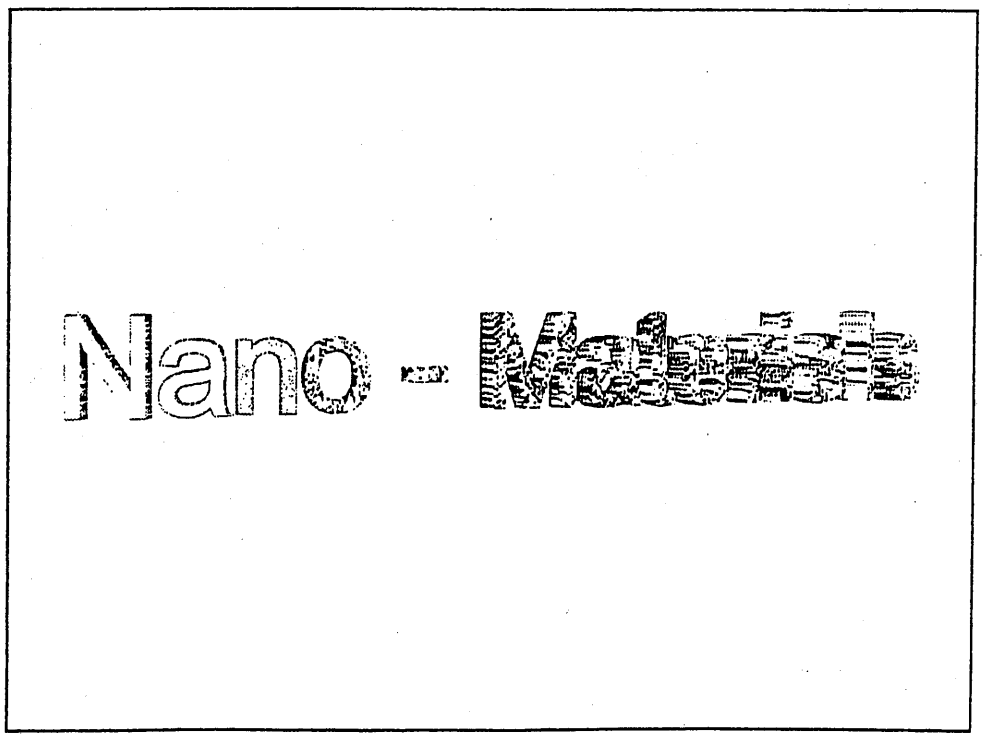



# Methods for Preparing Advanced Materials

# Mechanical Alloying

Although MA was originally used to deal w Scrapless process of very high melting e has been extended for other reasons


Advanced Materials
Nano-
Materials
(Nanocrystalline
Materials)
Nanocomposites
Metallic Glasses
&
Amorphous Alloys


Nano

Nanocrystalline materials (nanomaterials) are materials possessing grain sizes of less than 100 nm.

Nanocrystalline materials are receiving great attention as an important new class of nonequilibrium materials.

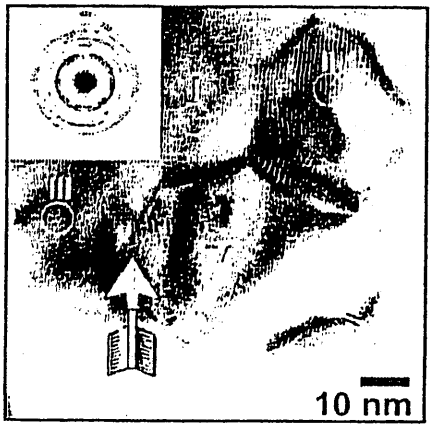
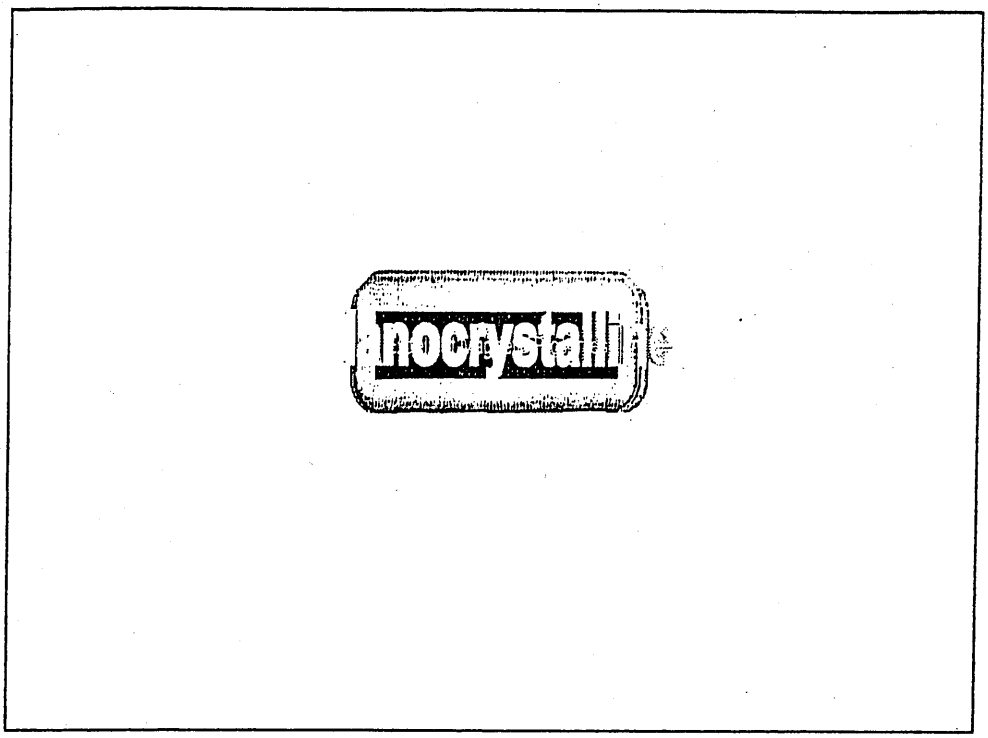
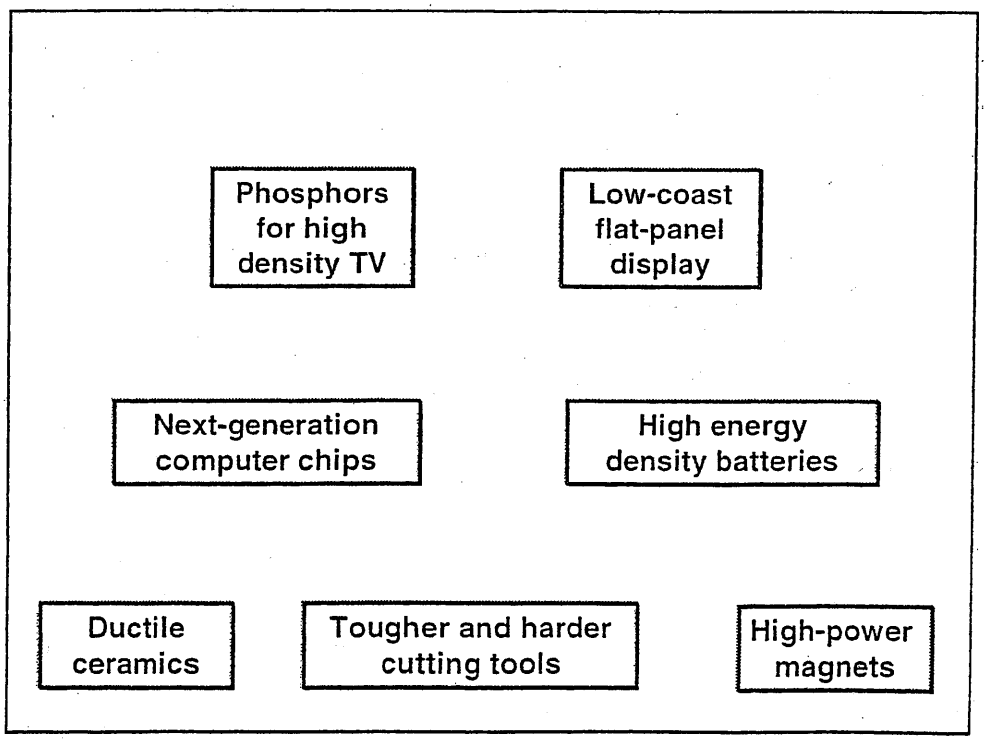



Fig. BFI and the corresponding SADP of mechanically disordered $Zr_2Ni$ powders after 360 ks of milling.
(After Sherif El-Eskandarany).

# Advantages of Nanocrystalline Materials


nocrystalli


Phosphors for high density TV
Low-coast flat-panel display
Next-generation computer chips
High energy density batteries
Ductile ceramics
Tougher and harder cutting tools
High-power magnets

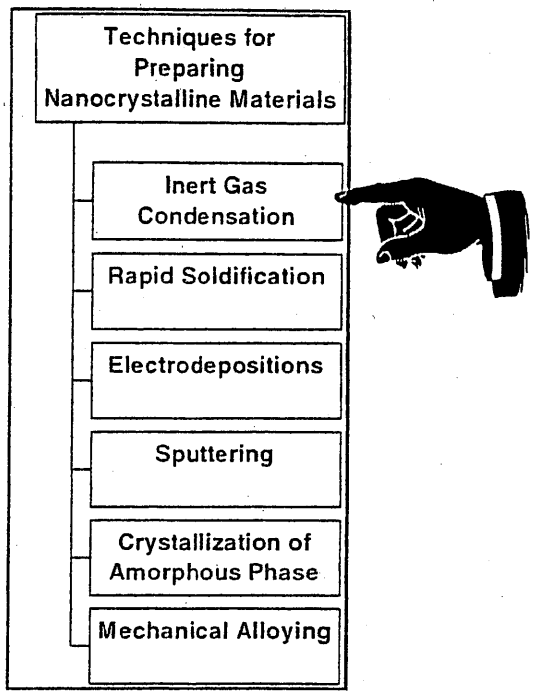



Fig. Nanocrystalline materials are a unique class of the advanced engineering materials that can be prepared by several methods.
(After Sherif El-Eskandarany).

# Nanocrystalline metal carbides

## Fabrications of Metal Carbides Refractory Materials

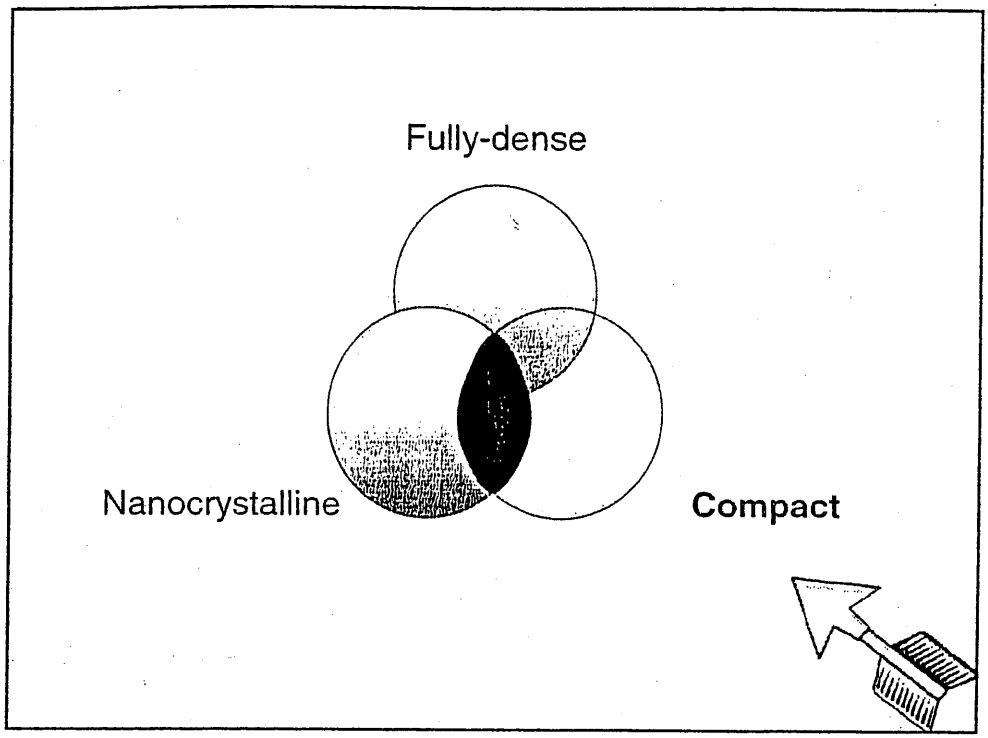
| Method | Reaction |
|---|---|
| *Direct reaction* between metallic elements or metallic hydrides and graphite, under vacuum or inert gas. | $TM + C \rightarrow TMC$ |
| | $TMH + C \rightarrow TMC + H_2$ |
| *Reduction* of the metal oxide by graphite, under vacuum or inert gas. | $TMO + C \rightarrow TMC + CO$ |
| *Reaction* of the metal with carburizing gas. | $TM + C_nH_{1-n} \rightarrow TMC + H_2$ |
| | $TMC + CO \rightarrow TMC + CO_2$ |

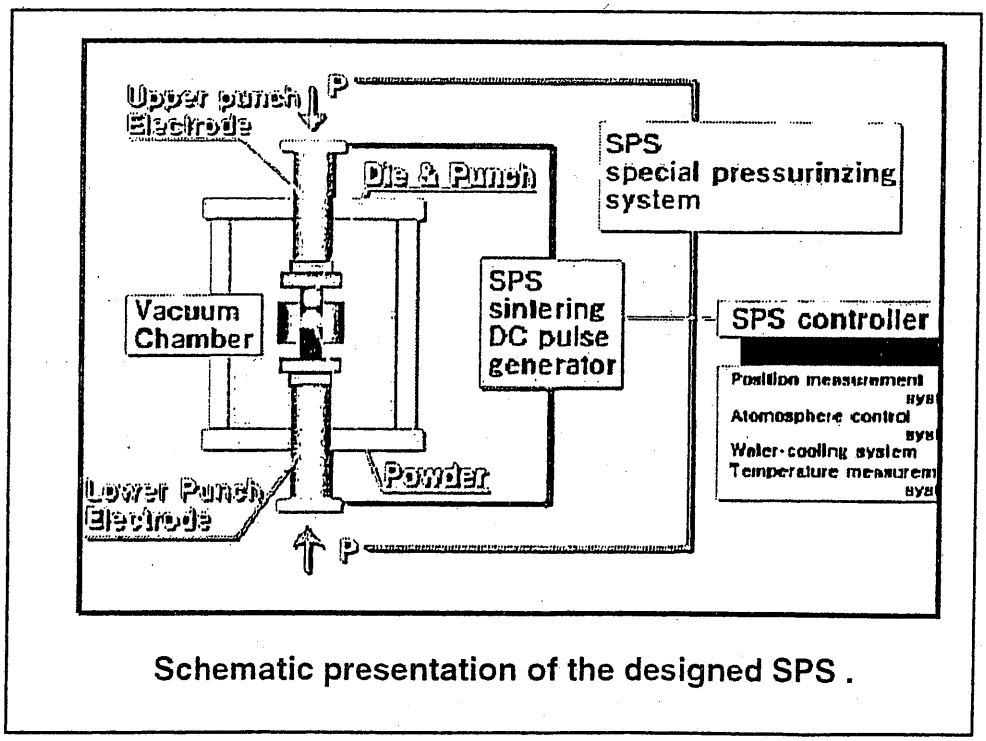
| Reaction | Temperature (°C) |
|---|---|
| $Ti + C \rightarrow TiC$ | 1700 - 2100 |
| $Zr + C \rightarrow ZrC$ | 1800 - 2200 |
| $Hf + C \rightarrow HfC$ | 1900 - 2300 |
| $V + C \rightarrow VC$ | 1100 - 1200 |
| $Nb + C \rightarrow NbC$ | 1300 - 1400 |
| $Ta + C \rightarrow TaC$ | 1300 - 1500 |
| $W + C \rightarrow WC$ | 1400 - 1600 |

## Consolidation

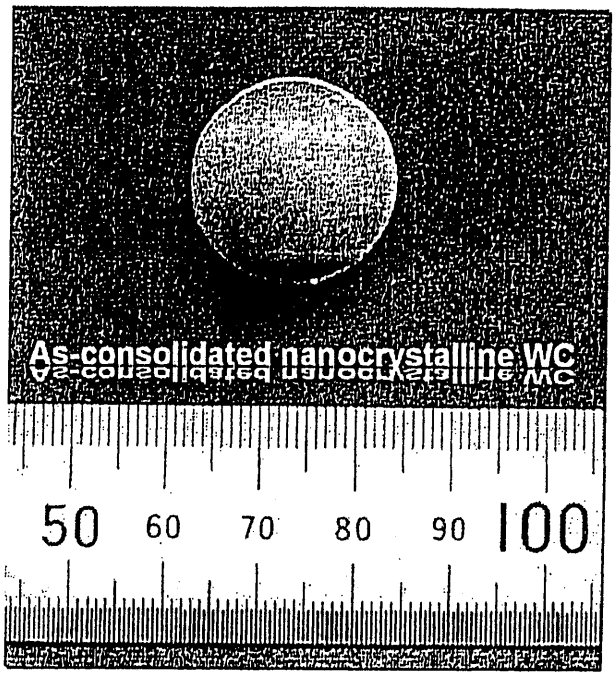
Consolidation of the mechanically alloyed nanocrystalline powders is a necessary step to measure several physical and mechanical properties of the fabricated materials. It is also a required procedure for most the industrial applications.

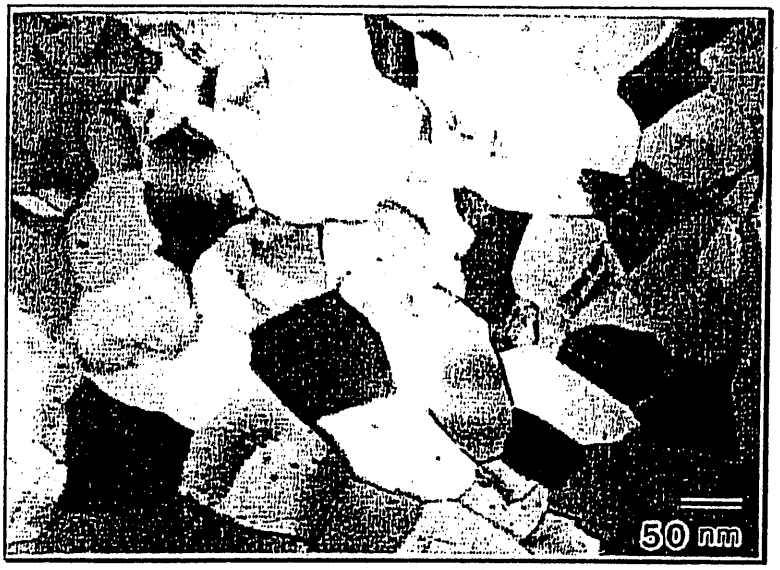
It is very during the consolidation procedure to maintain the nanocrystalline behavior without any drastic grain growth.



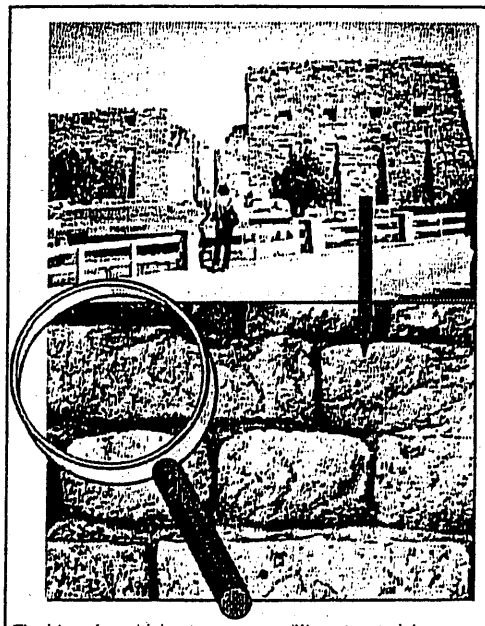

**Schematic presentation of the designed SPS .**




BFI of as-consolidated ZrC milled powders. (After Mahdy et al.).

# Solid-State Mixing FOR FABRICATION OF Nanocomposites



The idea of combining two or more different materials resulting in a new material with improved properties dates back to 3000 years, when the Pharaohs of Egypt knew that plant fibers helped strengthen and prevent bricks and pottery from cracking.

The displayed shows a typical composite material, which consists of brick (dark-gray block matrix) where the plant fiber materials (light-gray needle-like material) are embedded.

A composite material is made up of two or more distinctly different materials, and when combined, form a new material with properties that are far superior than its individual components. Combining the different materials is a physical process rather than a chemical one in which the materials interact to yield properties not attainable by either alone.

## Advantages of the Composite Materials

- High structural strength
- Lightweight
- Resistance to chemical wear and corrosion
- Toughness (impact strength)
- Mechanical stiffness
- Heat resistance
- Ease of processing (manufacturing)

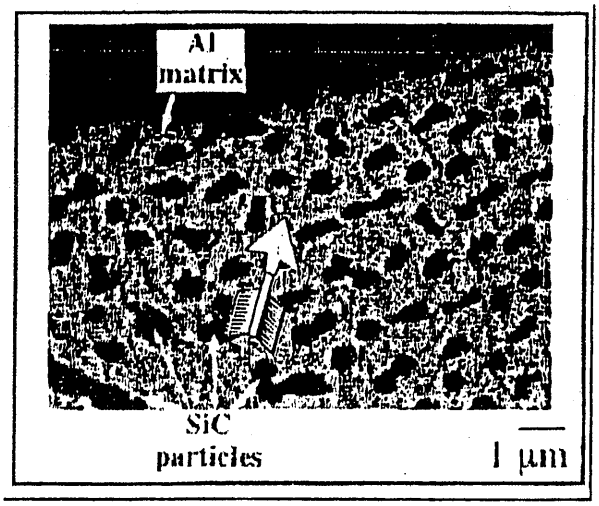
## Common Categories of Composite Materials

Random fiber (short fiber) reinforced composites

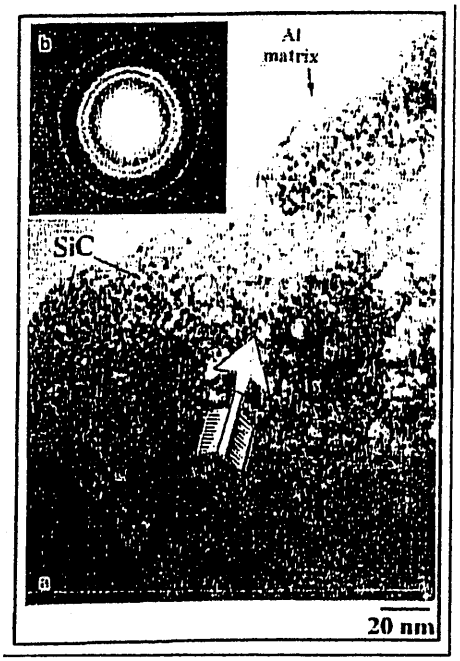
Continuous fiber (long fiber) reinforced composites

Flat flakes as the reinforcement (Flake composites)

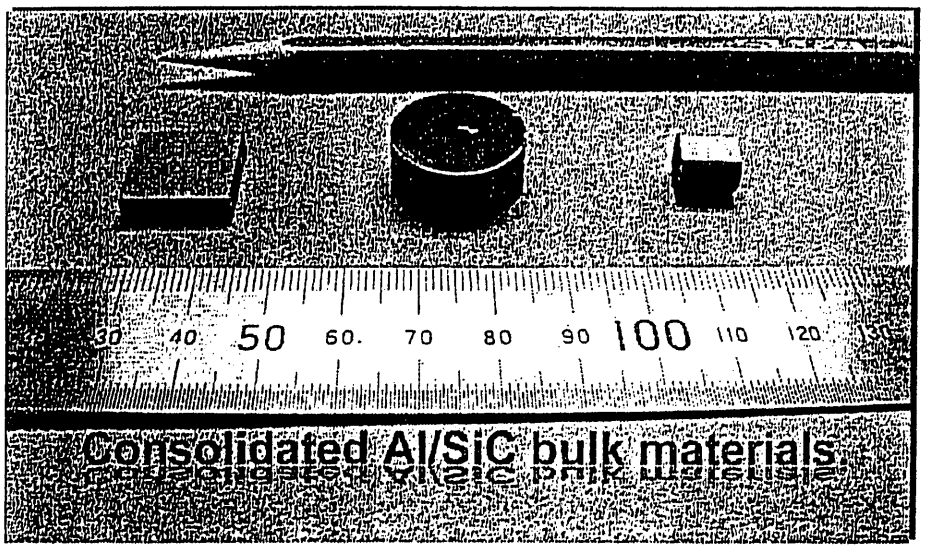
Particles as the reinforcement (Particulate composites)

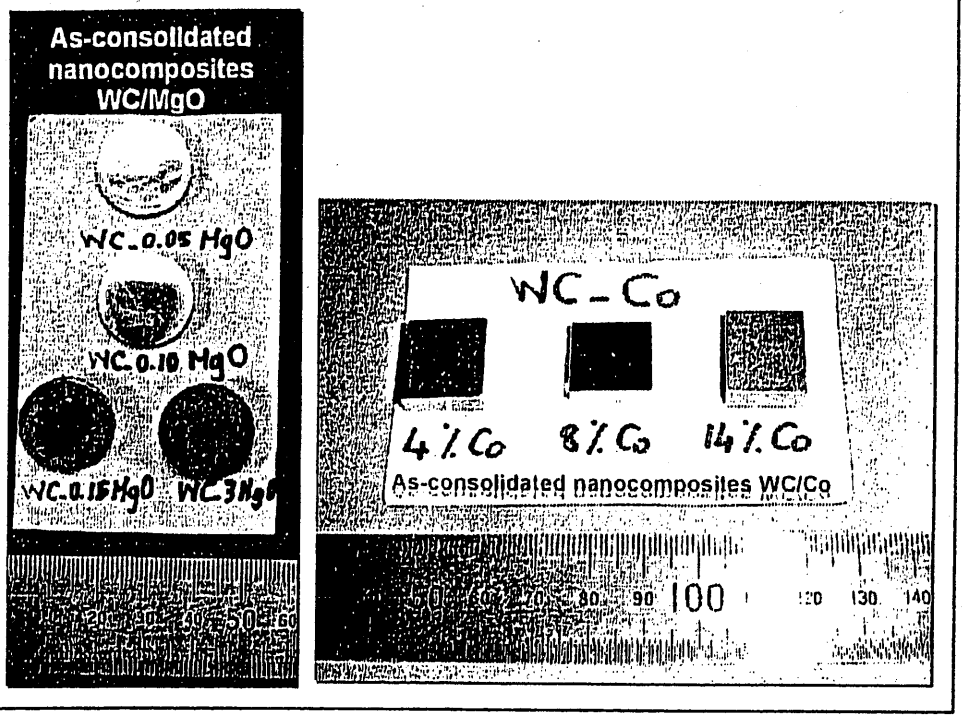



SEM micrograph of the cross sectional view for Al- 10% SiC after ball milling for 24 h (After El-Eskandarany et al.).




(a) BFI and the corresponding SADP of the cross sectional view for Al- 10% SiC after ball milling for 24 h (After El-Eskandarany et al.).

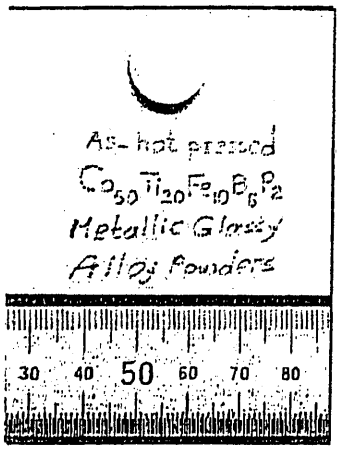


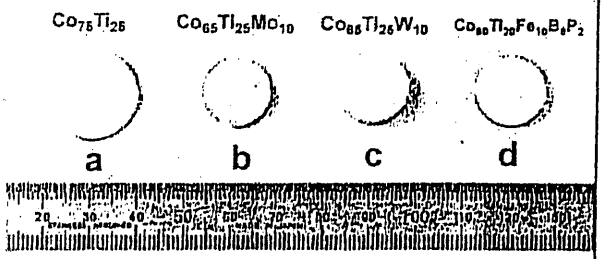



Some Measured Physical and Elastic Moduli of the Fabricated Nanocrystalline WC and Nanocomposite WC-18%MgO Materials. (After El-Eskandarany).

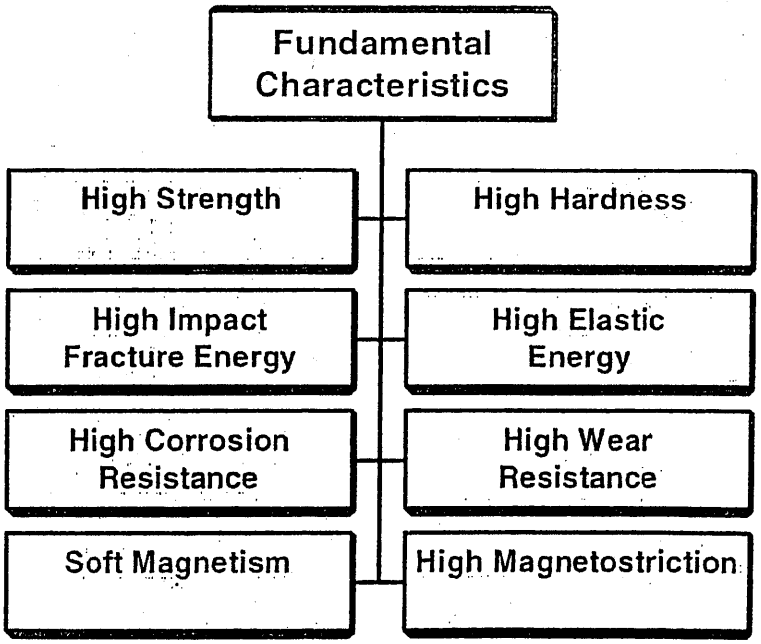
| | Consolidated sample of as-mechanically reacted and then leached WC | Consolidated sample of as-mechanically reacted WC-18 at. % MgO |
|---|---|---|
| Density (g/cm$^3$) | 15.6 | 13.1 |
| Poisson's ratio | 0.004 | 0.209 |
| Young's modulus (GPa) | 813.5 | 413 |
| Shear modulus (GPa) | 405.1 | 171 |
| Bulk modulus (GPa) | 273.4 | 237 |
| Hardness (GPa) | 23 | 15 |
| Fracture toughness (MPa·m$^{1/2}$) | 4 | 14 |

# Soft Magnitic Materials

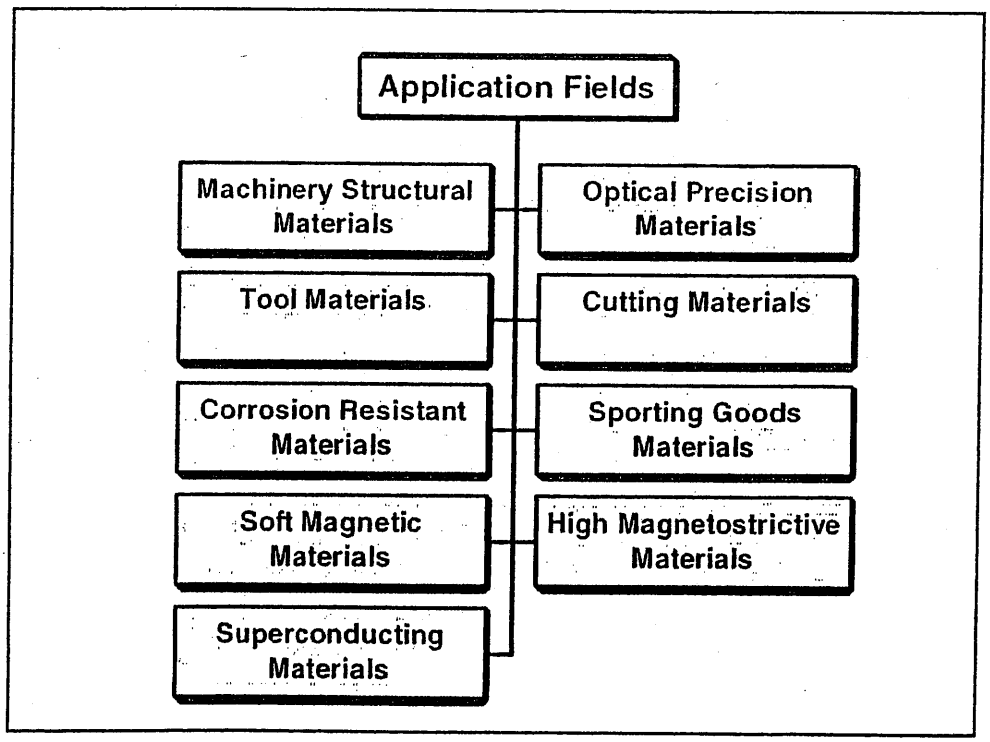


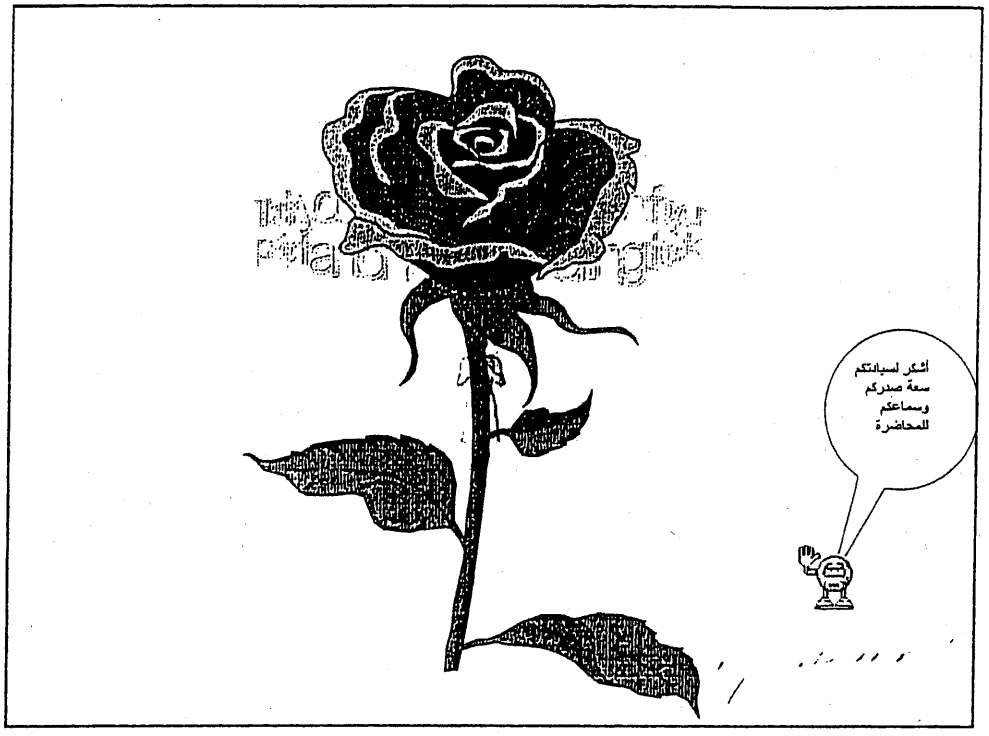




As-consolidated mechanically alloyed Co-based glassy powders.



# Applications




أشكر لسيادتكم
سعة صدركم
وسماعكم
للمحاضرة

# High Education and Academic Research System in future Egypt

**Dr. Amr Ezzat Salama**

**Minister of State for High Education and Scientific Research**

## Mission

The mission of the High Education and Academic Research System in Egypt is to disseminate knowledge, ensure the pursuit of excellence and competitiveness and serve as a prime mover for development, innovation and creativity .

- **The production, dissemination and application of knowledge can be accomplished through the following elements:**

  - High quality research..
  - Production and dissemination of scientific knowledge..
  - Promoting the culture of science at all levels of society.
  - Ensuring that Egypt is poised for playing a leading role in the future.
  - Enhancing continuing education and life-long learning.
  - Building a major scientific infrastructure.
  -

- **The pursuit of excellence and competitiveness can be accomplished though:**

  - High quality education.
  - Efficient performance.
  - Introducing new types of high education and academic research.
  - Ensuring flexibility and mobility within the high education and academic research system.
  - Highly committed and efficient academic community.
  - Establishing effective links with prestigious educational and research institutions abroad.
  - Granting internationally accredited academic degrees.
  - Developing an academic and research community capable of promoting and developing itself.
  - Setting incentives for scientific excellence.

**Development (High Education and scientific research as a prime mover for development). This can be accomplished through:**

- Defining and creating new axes for development.
- Introducing joint and interdisciplinary specialties.
- Participating in the management of research and development.
- Contributing positively to the process of human development..
- Monitoring and analyzing economic, social and developmental performance.

- Creating the necessary academic cadres to lead development programs

- **Innovation and creativity**

This can be achieved through

- Creating scientific and technological centers of excellence.
- Creating research and technological entities in collaboration with high-tech institutions.
- Establishing a set of scientific and technological incubators, and parks within universities and scientific research centers.
- Putting in place a system for the economic management of scientific and technological innovation and creativity.
- Introducing programs for scientific achievement and the encouragement of talents in universities and scientific research centers.
- Developing the research capabilities of academic cadres.
- Attracting Egyptian scientists and researchers working abroad.
- Supporting the protection of intellectual property rights and protecting the information of patents.

## Axes of action to achieve the goals of high education institutions

- **First axis** Increase the absorbing capacity of the high education System
- **Second axis** Evaluate performance and quality assurance.
- **Third axis** Use information technology to enhance the educational, research and administrative capabilities of the high education system.
- **Fourth axis** Develop the systems of post-graduate studies and scientific research within high education institutions.
- **Fifth axis** the capacity building of teaching, administrative staff and academic leaders within high education institutions.
- **Sixth axis** Support student activities and update by-laws.

## Axes of action to achieve the above-mentioned goals

### First axe: Increase the absorbing capacity of high education system.

- **Facts and requirements**

There is a need to increase the absorbing capacity of high education to achieve the following purposes:

- Meet the increased and changing demand for high education.
- Increase the percentage of students enrolled in high education in the age group 18-23.
- Ensure that the high education system is flexible and provide a wide scope of choices and opportunities.
- Meet the requirements for continuing education and life-long learning.

- Meet the needs of the development sectors for highly qualified academics.
- Promote the role of high education as a source of national revenues.

- Requirements for achieving the above-mentioned goals:

  - Set a general plan for the high education system (2004-2005).
  - Prepare a general law for high education system covering all its types of education, governmental, civil and private.
  - Increase the absorbing capacity of the existing state universities.
  - Turn some university branches into independent universities. It is envisaged that the branches of Banha, Beni Suef and Fayoum will be turned into independent universities within the academic year 2005-2006, and the branches of Suhag and Kafr El-Sheikh within 2006-2007.
  - Restructure some faculties to ensure the optimum use of their physical and academic resources, while making use of the most updated and internationally accredited systems of education in which students have to contribute part of the actual cost of study. This will be applied as of the year 2005/2006 starting with the specialties of engineering, medicine, dentistry, pharmacy, sciences and education.
  - Increase the absorbing capacity of private universities and high institutions.
  - Establish a number of private universities as recommended by the existing laws and regulations and in accordance with the general plan for the high education system.
  - Set rules and criteria for the establishment of new universities and institutions.
  - Declare the plan of the Ministry of High Education up to the year 2007.
  - Set up a community university as a national project to be adopted by civil society organizations, juristic persons and citizens (the first stage is to start in 2006/2007.
  - Amend law No. 101 of 1992 for private universities to cover non-governmental universities and other types of

newly formed universities as part of the trend to encourage community-based initiatives.

- Establish a university for remote learning to be funded by the state during the construction phase and for three years thereafter. Subsequently, the university is to depend on its own resources (The first phase starts in 2006/07).
- Allow professional civil society organizations to establish professional universities such as a university for engineering sciences to be established by the Federation of Industries, Contractors' Union and Engineering syndicates; a university for economic & administrative sciences to be established by the Federation of Banks, the Union of Insurance Companies, the Federation of Trade Chambers; a university for medical and pharmaceutical sciences to be established by physicians' syndicates and unions, pharmaceutical companies and health insurance companies; a university for teacher training and educational studies to established by the Teachers' Syndicate, the Union of Private Schools and Institutions and Arab Teachers' Union.
- Establish specific high institutes (private sector) in accordance with the general plan for the high education system. It is envisaged that 10 institutes will be established throughout the period 2005-07.
- Establish a number of distinguished technology faculties which follow an accredited international system (4 technology faculties during the period from 2005-2007).

**The Second axis**

**Facts and requirements:**

There is a need to have:

- An inbuilt institutional system inside educational institutions and research centers to assess performance and monitor quality assurance (Performance Assessment Centers).
- A national system outside the educational system to assess performance and monitor quality assurance (An independent authority).

- **Requirements and mechanisms for achieving these goals:**

- An inbuilt institutional system inside the educational institutions and research centers must be in place to assess performance and monitor quality assurance (Performance Assessment centers).

- A national machinery to assess performance and monitor quality is to be created outside the educational institutions (an independent agency).

- **The inbuilt institutional system is to work as follows:**

    - Create an atmosphere conducive to efficiency and ensuring confidence in the quality of the existing high education institutions and its outputs.
    - Foster the culture of commitment to offering high quality education among the academic community and its staff.
    - Institute systems for performance evaluation and quality insurance inside educational institutions.
    - Create Performance Evaluation Centers at the level of the high education system, governmental and private over the period from 2004-07.
    - Finalize the process of preparing academic criteria for a number of 450 academic degrees.
    - Ensure that educational institutions are to prepare their own studies and evaluate them on a periodical basis.
    - All high education institutions are to complete the above-mentioned studies over the period from 2004/07.
    - Shortfalls are to be addressed and aspects of excellence maximized based on the performance evaluation and quality assurance reports.
    - Throughout the period from 2004-07, 30% of the colleges and institutes will have completed preparations for the second phase of the evaluation.
    - By 2008, 10% of the colleges and institutions will have applied for accreditation.

- A national machinery to assess performance and monitor quality is to be created outside the educational institutions (an independent agency).

- This machinery takes the form of a national agency to ensure quality and accreditation for the institutions of the high education system and to carry out the following activities:
  - Review draft laws.
  - Start to prepare the executive regulations
  - Create a fund to finance the drive to develop education.
    - A republican decree was issued to create this fund.
    - The bylaws of this fund have yet to be made.
  - Support and restructure the Information and Statistical Studies Unit established within the Specialized Centers affiliated to the Higher Council for Universities, which serve all high education institutions.

- **Third axis** Use information technology to enhance the educational, research and administrative capabilities of the high education system.

- **Facts and requirements:** there is a need to:
  - Complete the components and applications of e-government within high education and scientific research institutions.
  - Ensure the continuing development of scientific and training programs, curricula and methods of teaching.
  - Introduce new types of education to cope with international advancement and meet the increasing demand for higher education.
  - Open up to and benefit from the various information sources and international libraries.
  - Increase the abilities of the academic and administrative staff of high education and academic research institutions to deal with information and communication technologies and multimedia.

- **Requirements for achieving the above-mentioned goals:**
  - Upgrade the infrastructure of Egyptian universities so as to meet the whole requirements of the high education system.
  - Complete the system of e-management within the high education institutions and networking it with Egyptian universities (Up to 2007).
  - Prepare a plan at the level of each university or educational sector to apply the principle of self-education and electronic communication within the formal education (2006-2007), so that 10% of the educational curricula can be taught through self-education.
  - Establish centers offering the services of high education through information and communications technologies (2004/07). These include:
    - Centers for the electronic preparation of academic programs and educational curricula.
    - Centers for training the teaching staff and researchers on utilizing and making use of information and communication technologies.
    - Centers for collecting information sources, references and electronic periodicals and making them available on the websites of Egyptian universities and on the National Network for Information.
  - Make use of the initiatives offered by UNESCO to support High Education. To this end, the following steps can be taken:
    - Expand the opportunities offered to obtain the International Computer License or its equivalent at the level of high education institutions.
    - Offer a training program on e-learning in collaboration with Illinois University.
    - Organize open software programs on the following disciplines:
      - Management systems.
      - Digital libraries.
      - Scientific applications

- Support and increase the efficiency of teaching sciences and math.

- **Fourth axis** Develop the systems of post-graduate and scientific research within high education institutions.

  - **Requirements:**
    - Enhance the capabilities of the scientific community as well as their academic and research performance inside and outside universities.
    - Prepare efficient cadres among the academic community of the institutions of high education and academic research.
    - Prepare research cadres to cover the research and development needs of the production and services sectors.
    - Contribute to creating an atmosphere conducive to life-long learning in view of its positive impact on human development.
    - . Increase the capabilities of society to produce and acquire knowledge.

- **Requirements for achieving the above-mentioned goals:**

  - Restructure the systems of postgraduate studies based on the number of the approved hours (credits) which ensure that they will extend throughout the academic year, while making the best use of available resources (2005/97).

  - Encourage and motivate academic cadres with distinguished scientific production to specialize in a specific area of specialty or a group of relevant specialties. Applying this trend will start with 5 pilot specialties (2005/06).

  - Create a fund for supporting scientific and technological research.

- Expand the initiation of post-graduate degrees (diplomas and joint degrees) as well as internationally accredited programs to raise the academic capabilities and provide continuing training needed by the various areas of development (It is proposed to initiate 20 professional diplomas and accredited training programs up to 2007).

- Expand the institution of joint academic degrees with prestigious universities abroad, while ensuring that academic degrees granted at the international level shall be accredited (10 degrees at the level of master degree over the academic year 2007/07). Egyptian candidates for these degrees shall bear part of its costs while non-Egyptian candidates shall bear the whole cost).

- Establishing a publishing house for the dissemination of scientific production and translations in collaboration with prestigious international publishing houses.

- Prepare a general plan for missions to be sent abroad based on the national needs for the various specialties within the framework of development plans.

- Upgrade the general departments for missions through establishing databases and applying the e-management and networking systems (2006/07).

- Establish long-term contractual relationships with prestigious universities in advanced countries and in the specialties required by the plans for the missions to be sent abroad (5-10 universities up to 2007).

- Approve e-education, remote education and self-education as educational tools accredited by the postgraduate studies system and in the stage of preparing for missions to be sent abroad.

- **Fifth axis** the capacity building of teaching, administrative staff and academic leaders within high education institutions.

**Requirements:**

- The capacity building of teaching, and academic leaders so as to ensure raising the efficiency academic and institutional performance.
- Instill in the minds of the teaching staff and academic leaders the importance of the self-development of capabilities and skills.
- Train the academic, technical and administrative cadres on the modern systems of management within high education institutions.
- Examine the alternatives and mechanisms by which to increase the income of the teaching staff and their assistants.

- **Requirements for achieving the above-mentioned goals:**

  - Create mechanisms for providing continuing training at the level of each educational institution.

  - Prepare and accredit a number of training centers at the national level (15-20 training centers are to be prepared and accredited over the period 2004/06).

  - Implement training programs and create an environment supportive for the self-development of skills and capabilities (It is envisaged that up to 2007, 600 highly skilled trainers of the teaching staff will have been prepared to carry out training programs within universities and high education institutions. A total of 30% of the teaching staff and academic leaders will conduct one training program of 24 training hours at least every academic year).

  - Exchange and share international experience in this area (4 training centers are envisaged to be accredited at the national level up to 2007).

- Make academic and professional promotions conditional on the completion of certain training programs (2006/07).

- **Sixth axis** Support student activities and update by-laws.

  - **Goals**
    - Draw up a comprehensive system for developing student activities aiming at the integrated development of the characters of students and enhancing their creative and innovative capabilities.
    - Foster patriotic feelings and the sense of solidarity among students.
    - Foster a sense of communication between students and the university teaching and administrative staff.
    - Improve the services offered to students on campus, university hostels and sites of recreation and sports activities.

  - **Required measures:**

    - Upgrade university regulations in such a way as to increase student participation.
    - Support student activities and encourage talented and distinguished students.
    - Increase the efficiency of services offered to students and ensure that their cultural activates are well-nurtured and given due attention by the media.
    - Ensure that due attention is given to the health care of students and develop the performance of university hospitals and clinics to offer high quality health care services.