

CURRICULUM VITAE

DAN LUPU

Personal Details

Title: Dr
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Linguistic Skills

English: fluent
French: average

Education

1969-1972 Ph.D student, Institute of Chemistry, Cluj Napoca, Romania, Ph.D-thesis on
"Study of the mixed-valence iron trinuclear acetates". Title: Doctor in
chemistry
1959-1964 student, Faculty of Chemistry dept. of Inorganic Chemistry, Babes-Bolyai
University, Cluj Napoca, Romania. Title: chemist

Employment History

1964-1973 researcher, Institute of Chemistry "Raluca Ripan", Cluj Napoca, Romania
1973- present time currently employed- National Institute for R&D of Isotopic and Molecular
Technologies (1987-2003 head of department of materials), presently- Senior
Researcher I

Experience

1964-1973

Magnetochemistry: development of laboratory equipment for measurements of the
magnetic susceptibility by the Gouy and Faraday methods. Characterization of transition metal
compounds - valence state and interactions between their magnetic moments, electron transfer in
mixed valence compounds; introducing students and researchers in magnetochemistry.

**Fundamentals of metal-hydrogen systems: thermodynamics, phase diagrams,
absorption/desorption kinetics, catalytic effects**

**Experimental: working procedures of handling and methods for characterization of hydrogen
storage materials, electrodes for Ni/MH batteries, catalysis by ball milling**

1975-2006

Hydrogen storage materials and applications:

Since 1975 in INCDTIM- Cluj Napoca started the work in the field of hydrogen storage
materials, under the National Program of Hydrogen in Romania. Participating directly in the
elaboration of the laboratory equipment necessary for the characterization of the hydrogen absorption
in metals and alloys. Various types of valves constructed in the workshop of the institute were tested
to find the technical solutions to avoid leakage of hydrogen and to obtain accurate data for pressure-

composition-temperature characteristics of the solid state hydrogen storage materials (absorption/desorption isotherms). Equipment for the preparation of alloys and intermetallics (resistive furnace, arc furnace under pure argon in cooled copper mould) were also set up in this stage. In order to study the absorption/desorption kinetics, methods and equipment have been elaborated both for kinetic studies on hydrogen storage materials and for their behavior to absorption/desorption cycling. The main objectives of the multidisciplinary group (chemists, physicists and engineers) have been focused on new materials with improved hydrogen storage capacity and applications of metal hydrides.

Characterization of all the classes of solid state hydrogen storage materials such as LaNi₅ type, FeTi, AB₂ Laves phase, Mg₂Ni, Mg₂Cu intermetallics: absorption capacity, absorption/desorption isotherms and thermodynamic characteristics, reaction kinetics, isotope (hydrogen, deuterium) effects, application related properties (activation, hysteresis, cycling behavior). Characterization of complex hydrides NaAlH₄, LiAlH₄ to absorption/desorption after ball milling with catalysts.

Participating directly in projects for large scale production of FeTi and Ti-Cr-Mn alloys (with IAMN Bucharest) required by hydrogen storage containers for applications.

Laves phase alloys as hydride electrodes for Ni/MH batteries (over 40 alloys): absorption/desorption isotherms, preparation of electrode with a proprietary composition (patent), discharge capacity, charge/discharge cycling. New Co-free Laves phase alloys were tested, with good characteristics as hydride electrodes, in cooperation with Prof. Dr. Andreas Züttel and Prof. Dr. Louis Schlapbach - University of Fribourg, Switzerland.

Characterization of hydrogen uptake by carbon nanofibers, and carbon nanotubes by gravimetric (high pressure microbalance) and volumetric methods. The results, within the same range reported by Swiss and German groups, invalidated the data reported by many authors, concluding that high H-uptake was often due to leakage of hydrogen.

Knowledge of the data required for complete characterization of a hydrogen storage material. Participant with the responsibility of selecting materials in application related projects: large scale production of FeTi and Ti-Cr-Mn alloys (colaboration with IAMN Bucharest) for metal-hydride storage containers, applications to mixed combustion in Diesel engines, heat pump experiments, water pump with metal hydride (demonstration experiment), high purity hydrogen containers for laboratory use, metal hydride based metal-ceramic bonds.

2001-2006

Synthesis of carbon nanotubes:

Methods and catalysts developed for the synthesis of single-wall carbon nanotubes, multi-wall carbon nanotubes and carbon nanofibers by **a new variant of catalytic decomposition of hydrocarbons using induction heating.**

1981-2006

Referee to *International Journal for Hydrogen Energy* (USA), in 2004 for 3 papers; 2006 – 1 paper

Referee to *Carbon* for 2 papers in 2005

Mandates

Member of the Balkanic Regional Council of experts in Nanoscience and Nanotechnology

Affiliation

1992- Member of the Romanian Society of Physics

2005- Member of the Romanian "Association for Hydrogen and Fuel Cells"

Projects (last 5 years)

- 1996-2000 "Materials and technologies for Metal Hydride Electrodes of Ni/MH batteries"
–project manager
- 2001-2004 "Devices for the storage of Hydrogen Isotopes"-team leader
- 2004-2006 "Interface and surface phenomena in the synthesis of carbon nanotubes"
– project manager
- 2004-2006 "Influence of the dimensionality morphology and structural order on hydrogen storage in amorphous and nanostructured alloys" – team leader
- 2004-2005 "Development of integrated research platform in the field of energy"
– (national project in consortium) – team leader

- 2005-2008 “Nanostructured composites with carbon nanotubes for applications in optoelectronics and Li-batteries” –(national project in consortium, coordinated by INFM Bucharest)
– team leader
- 2006-2008 “Advanced hydrogen storage materials for fuel cells” – project manager