

CURRICULUM VITAE

ATEF KORCHEF, Ph.D, HDR

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FORMAL EDUCATION

- 2010** **Habilitation in 'chemistry'** Faculty of Sciences of Sfax, University of Sfax, defended on March 15, 2010
- 2004** **Ph.D. in 'chemistry' (very honourable)** (Faculty of Sciences of Sfax, University of Sfax), defended on November 19, 2004
- 1999** **Diploma of Advanced Studies (DEA) in 'Inorganic Chemistry' (with distinction)** (Faculty of Sciences of Sfax, University of Sfax) defended on November 19, 1999
- 1997** **Licence in 'Physical Sciences'** (Faculty of Sciences of Bizerte, University of Carthage)

PROFESSIONAL EXPERIENCE

- April 2011-present** Professor (Maître de Conférences), National Centre of Researches in Materials Sciences
Ecopark of Borj-Cédria, Tunisia
- 2006- March 2011** Assistant Professor, Water Researches and Technologies Centre,
Ecopark of Borj-Cédria, Tunisia
- 2004-2006** Assistant, National Institute of Scientific and Technologic Research,
Borj-Cédria, Tunisia
- 09/2003-03/2004** Contractual Assistant, Faculty of Sciences of Sfax, University of Sfax.
*Teaching inorganic chemistry (TE1), chemistry of solutions (SP1) and general chemistry (SVT1)
*Responsible of experiments in inorganic chemistry (TCI1) for special education class.
- 09/2002-03/2003** Contractual Assistant, Faculty of Sciences of Sfax, University of Sfax.
*Teaching inorganic chemistry, (TCI1), Chemistry of Solutions (CAP1) and general chemistry (SVT1).

PROFESSIONAL SERVICES

- Refereed Research Papers reviewer for:
 - Materials Research Bulletin
(Elsevier publishing)
 - NanoTrends Journal
(Nano Science and Technology Consortium)
 - Journal of Hazardous Materials
(Elsevier publishing)
 - Materials Science and Engineering A
(Elsevier publishing)
 - Journal of Chemical & Engineering Data
(American Chemical Society (ACS) publications)
 - Journal of Atmospheric Environment
(Elsevier publishing)
 - Chemical Engineering Communications
(American Chemical Society (ACS) publications)

RESEARCH ACTIVITIES

From 1999 to present, Dr. Korchef became a pioneer in materials characterization (metals, alloys, inorganic materials). He works in collaboration with national and international laboratories, especially in France and Greece. Major contributions have been in several areas:

Activity 1: Microstructure, mechanical properties and corrosion behaviour of metals and alloys

Research focus is on characterizing the microstructure and mechanical properties of metals and intermetallic phases subjected to severe plastic deformation such as ball-milling, cold rolling, filling and equal channel angular pressing.

Major contributions have been in several areas:

-Intermetallic phases (Ni_3Al , Nb_3Sn , Ni_3Fe ...) are used for high temperature applications. Their physical and mechanical properties at elevated temperature are more interesting than of superalloys or ceramics. However, the major problem of intermetallic alloys is their intergranular brittleness. Their ductility could be enhanced by addition of small diameter atoms like boron. Thus, further potential applications for intermetallic phases are developed such as heating elements, turbines, valves, etc. When an ordered undoped or boron-containing Ni_3Al alloys are subjected to plastic strain, caused such by ball-milling, cold rolling, filling and irradiation, the order is partially or completely destroyed. Research focus is on investigation of the evolution of

the recovery process of Ni₃Al alloy with annealing time and temperature and the effect of boron addition on the reordering process.

-Equal Channel Angular (ECA) pressing may be used to improve the mechanical properties of materials through high refinement of grains. The grain sizes introduced by ECA pressings are in the submicrometer or nanometer ranges. Therefore, the ECA pressed materials may be attractive for different superplastic applications. The improvement of the mechanical properties of UFG materials is generally accompanied by enhanced strain rate sensitivity and a lack of strain hardening resulting from the fact that the grain size is comparable to the dislocation cell size which corresponds to the mean free energy of the dislocation.

Research focus is on determining the ECA pressing effect on the grain refinement of aluminium alloys, establishing the relation between the microstructure and the mechanical behaviour of the material, understanding the strain hardening and the strain rate effect and studying the corrosion behaviour of severe plastic deformed metals and alloys.

Activity 2: sparingly soluble salts formation

As the scale formation, caused mainly by the accumulation of minerals such as CaCO₃ and CaSO₄, not only lowers the thermic conductivity and water flow rate, but even shortens equipment life, it has always been recognized as a serious constraint in practical applications. Research focus is on the effect of major constituent ions such as calcium, magnesium and sulphate on the precipitation of calcium carbonate and calcium sulphate in brackish and drinking waters. The precipitates were obtained using chemical method provoking precipitation by water CO₂ degasification. Also, investigation is focus on how inhibit their formation.

Activity 3: Drinking Water and wastewaters treatments through solid compounds precipitation

- Iron removal: The ultrafiltration of solutions containing colloidal suspension of iron precipitates requires establishing procedures of plugging control and cleaning because these species have strong plugging properties vis-a-vis the membrane. In order to avoid the membrane plugging, iron was removed from the raw waters using a pre-treatment process that includes certain operations such as oxidation and separation.

- Ammonium and phosphate removal: Ammonium and phosphate removal from wastewater through struvite (MgNH₄PO₄ · 6H₂O) precipitation prevents eutrophication and varies the phosphates resources. Struvite precipitation was provoked by the dissolved CO₂ degasification technique. The impact of physic-chemical parameters which control struvite precipitation such as the airflow rate, initial solution pH and constituent ions concentrations on struvite precipitation were assessed.

SELECTED INTERNATIONAL PUBLICATIONS

A. KORCHEF, A.W. KOLSI, N. NJAH. 'Mechanical behaviour of ultrafine grained aluminium containing Al₈Fe₂Si precipitates'
Physica Status Solidi (a) 203 (8) (2006) 1920-1926.

A. KORCHEF, Y. CHAMPION and N. NJAH 'X-Ray Diffraction Analysis of Aluminium Containing Al₈Fe₂Si Processed by Equal Channel Angular Pressing'
Journal of Alloys and Compounds 427 (2007) 176-182.

A. KORCHEF, A.W. KOLSI, N. NJAH. 'Annealing Effect on the Reordering of Severe Plastic Deformed Boron Doped Ni₃Al'
Journal of Materials Science 42 (2007) 5411-5415.

M. M. TLILI, A. KOHCHEF and M. BEN AMOR. 'Effect of scaling and antiscalant concentrations on fouling in a solar desalination unit'
Chemical Engineering and Processing 46 (2007) 1243-1250.

A. KOHCHEF, M. BEN AMOR, S. GALLAND, F. PERSIN. 'Effect of sulphate ions on iron precipitation from aqueous solutions'
Crystal Research and Technology, 43 (9) (2008) 943-948.

H. KAROUI, A. KOHCHEF, M. M. TLILI, H. MOSRATI, O. GIL, R. MOSRATI, M. BEN AMOR. 'Effects of Mg²⁺, Ca²⁺ and SO₄²⁻ ions on the precipitation kinetics and microstructure of aragonite'
Annales de Chimie, Science de Matériaux, 33 (2) (2008) 123-134.

A. KOHCHEF, M. BEN BRAHIM, M. BEN AMOR, A.W. KOLSI. Effect of filing on the microstructure of 1100 aluminium previously processed by equal channel angular pressing,
NanoTrends 5 (2008) 01-08.

A. KOHCHEF, N. NJAH., A.W. KOLSI. 'Microstructure investigation of equal channel angular pressed aluminium by X-ray diffraction and scanning electron microscopy'
Crystal Research and Technology, 44 (1) (2009) 106-110.

A. KOHCHEF, I. Kerkeni, M. BEN AMOR, S. GALLAND, F. PERSIN. 'Iron removal from aqueous solutions by oxidation, precipitation and ultrafiltration'
Desalination and Water Treatment, 9 (2009) 1-8.

H. SAIDOU, A. KOHCHEF, S. BEN MOUSSA, M. BEN AMOR. 'Struvite precipitation by the dissolved CO₂ degasification technique: impact of the airflow rate and pH'
Chemosphere 74 (2009) 338-343.

A. KOHCHEF, H. SAIDOU, M. BEN AMOR. 'Phosphate recovery through struvite precipitation by CO₂ removal: Effect of magnesium, phosphate and ammonium concentrations'
Journal of Hazardous Materials, 186 (2011) 602-613.

SELECTED NATIONAL AND INTERNATIONAL COMMUNICATIONS

A. KOHCHEF, M. BEN AMOR. "Improving struvite precipitation by CO₂ repelling in the context of phosphate removal from wastewaters "
The International Tunisia-Japan Symposium on Society, Science & Technology 2011, Hammamet, Tunisia, from November 11 to 13th.

A. KOHCHEF, I. KERKENI M. BEN AMOR, S. GALLAND, F. PERSIN. " Iron removal from aqueous solutions by oxidation, precipitation and ultrafiltration "
The International Symposium « Kantaoui Forum 9, Tunisia-Japan Symposium on Society, Science & Technology 2008 » Sousse, Tunisia, from November 10 to 11th.

A. KORCHEF, M. BEN BRAHIM, A.W. KOLSI, N. NJAH " Effect of annealing on the microstructure of aluminium processed by equal channel angular pressing and filing "

The International Symposium « Kantaoui Forum 9, Tunisia-Japan Symposium on Society, Science & Technology 2008 » Sousse, Tunisia, from November 10 to 11th.

A. KORCHEF, N. NJAH, Y. CHAMPION, C. LEROUX, S. GUERIN and A.W. KOLSI. 'X-Ray Diffraction Analysis and Strain Hardening of Aluminium Processed by Equal Channel Angular Pressing'

5th Edward A. Bouchet International Conference on Physics and High Technology organized by 'Association Des Mathématiques Et Applications' from August 11 to 15th 2003, Hammamet, Tunisia.

A. KORCHEF, N. NJAH, Y. CHAMPION, C. LEROUX, S. GUERIN and A.W. KOLSI. 'Deformation Anisotropy of Equal Channel Angular Pressed Aluminium Containing Al₃Fe₂Si Precipitates'

2nd International Conference on Advances and Mechanical Engineering (ICAME 2004) organized by the Scientific society from March 24 to 26th 2004, Sousse, Tunisia.

A. KORCHEF, M. TLILI AND M. BEN AMOR 'Problème de tartre dans une unité de dessalement de l'eau de mer par énergie solaire'

Journées Internationales Scientifiques et Pédagogiques de Mécanique et d'Énergétique from December 1st to 3rd 2005, Tozeur, Tunisia.

M. TLILI, **A. KORCHEF**, S. BEN AHMED AND M. BEN AMOR 'Scale Problem in Desalination Units Using Solar Energy'

Tunisia-Japan Seminar on Culture, Science and Technology (TJCST-2005) 6th Edition from November 7 to 12th 2005, Sousse, Tunisia.

H. KAROUI, **A. KOHCHEF**, H. MOSRATI, M. M. TLILI, M. BEN AMOR, O. GIL. 'Study of CaCO₃ Precipitation in Standard Sea Water at 60°C'.

Tunisian-Japan Seminar on Culture, Science and Technology (TJCST-2005) 6th Edition from November 7 to 12th 2005, Sousse, Tunisia.

A. KORCHEF, A.W. KOLSI, N. NJAH. 'Propriétés mécaniques d'un aluminium de recyclage à grains nanométriques'.

Journées Internationales Scientifiques et Pédagogiques de Mécanique et d'Énergétique from December 1st to 3rd 2005, Tozeur, Tunisia.

A. KORCHEF, N. NJAH and A.W. KOLSI. 'The Mechanical Behaviour of Aluminium Processed by Severe Plastic Deformation'

Les quatrièmes Journées Scientifiques organized by 'Ecole d'Aviation de Borj el Amri' (JS EABA 2003) from May 21 to 22 2003, Tunis, Tunisia.

A. KORCHEF, N. NJAH, Y. CHAMPION, C. LEROUX, S. GUERIN and A.W. KOLSI. 'Thermal Stability of the Microstructure and the Mechanical Properties of aluminium containing Al₃Fe₂Si Precipitates processed by Equal Channel Angular Pressing.'

Journées Scientifiques et Pédagogiques de Mécanique et Energétique (JSPME 2003) organized by 'ISET de Gafsa' from December 1st to 3rd 2003, Gafsa, Tunisia.

H. KAROUI, **A. KOHCHEF**, M. M. TLILI, M. BEN AMOR. 'Etude de la précipitation du CaCO₃ dans l'eau de mer standard : effet des ions Mg²⁺ et SO₄²⁻'.

Société Chimique de Tunisie, 2^{ième} Journée de Chimie de Solide, from December 19 to 21th 2005, Hammamet, Tunisia.