



SCHOOL OF MINES

UNIVERSIDADE FEDERAL DE OURO

PRETO

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Department of Metallurgical and
Materials Engineering*

*BIOPROAM Meeting
Ales, France
September, 2007*





Distance from:

- Belo Horizonte: 98Km
- Pampulha airport (local): 115Km
- Confins international airport: 140Km
- Rio de Janeiro: 403Km

History

Founded on October 12, 1876 - Over 130 years

UNDERGRADUATE COURSES

Mining engineering¹
Metallurgical engineering
Geological engineering
Civil engineering
Environmental engineering
Production engineering

GRADUATE PROGRAMS

- Materials Engineering (M.Sc. DSc).
- Mining Engineering (M. Sc.)
- Environmental Eng. (M.Sc.)
- Civil Eng. (M.Sc., D.Sc.)
- Geotechnical Eng. (M.Sc)
- Geological Eng. (M.Sc. D.Sc.)



Metallurgical and Materials Engineering

Graduate Program: Materials Engineering

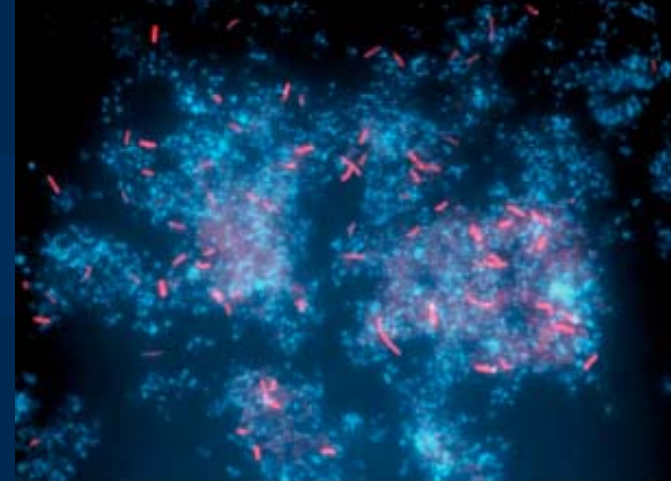
Master (1997) Doctorate (2001)

29 professors, 79 M.Sc. candidates, 25 PhD candidates

RESEARCH AREAS

- ✓ Physical, chemical and Micro structural characterization of materials
- ✓ Design and selection of materials
- ✓ Fatigue and failure of materials
- ✓ Modeling of physical and mass transfer properties of materials processing
- ✓ Corrosion
- ✓ Processing and refining of materials
- ✓ Hydrometallurgy
- ✓ Effluent treatment – reuse of water
- ✓ Materials recycling
- ✓ Materials synthesis
- ✓ Heat treatment

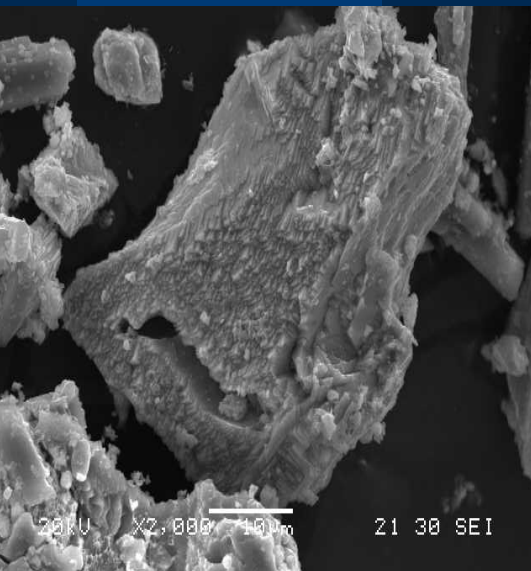




Hydrometallurgy

Effluent treatment

Water reuse



NÚCLEO DE VALORIZAÇÃO DE MATERIAIS MINERAIS - NVMM

Department of Metallurgical and Materials engineering (DEMET)

Partnership - Un. Fed. Ouro Preto - Université Liège 2000

Professors

Versiane Albis Leão

Carlos Antônio da Silva

Mônica Cristina Teixeira

Anderson Dias

Renata Guerra de Sá

Rosa Malena Lima

Hermínio Arias

06 Master students

05 PhD students

06 undergraduate students

8 scholarships

RESEARCH AREAS:

Leaching and bioleaching

Chemical leaching (ZnS , CuFeS_2 , Cu_5FeS_4)

Chemical leaching kinetics

Bioleaching (ZnS , CuFeS_2 , Cu_5FeS_4) 

Heap leaching and bioleaching (sulfides and oxides)

Solution purification (IX)

Gold cyanide recovery

Nickel-cobalt extraction

Effluent treatment (chemical and biological) - Water reuse

Treatment of sulfate contaminated waters

Manganese removal

Recycling of water in the zinc industry

Microbiology/Molecular biology

Fe(II) oxidation modeling  

Microorganism identification (SRB, Fe and S oxidizers).

EQUIPMENT

SURFACE STUDIES/ MINERALOGY/ MICROSCOPY/ ANALYTICAL

- _ SEM/EDAX, XRF, XRD, FTIR, RAMAN,
- _ TG-DTA, TG-FTIR, TG-MS
- _ Optical and AFM microscopes
- _ Atomic Absorption, ICP-OES, UV-Visible, ionic chromatography, HPLC

COMMINATION/SEPARATION/SAMPLE PREPARATION

- _ Crushing, screening
- _ Particle size measurement: Cilas, BET

LEACHING/RECOVERY

- _ Electrochemistry of leaching - electrowinning
- _ Pressure leaching (titanium autoclave)
- _ Bioleaching: Batch and continuous
- _ Ion Exchange

Miscellaneous

- _ Microbiology facilities
- _ Molecular biology laboratory
- _ Metallurgical reactors modeling

PILOT PLANT

- _ Multi-stage continuous bioleaching,
- _ Flotation circuit



Publications

- LEÃO, V. A. ; RIANI, Josiane Costa ; SILVA, Carlos Antônio da ; MOREIRA, Adarlene ; Bertolino, S. M. ; LUKEY, Grant C . THE ELUTION OF METAL CYANOCOMPLEXES FROM POLYACRYLIC- AND POLYSTYRENE-BASED ION EXCHANGE RESINS USING NITRATE AND THIOCYANATE ELUANTS. Brazilian Journal of Chemical Engineering, v. 24, p. 421-431, 2007.
- LEÃO, V. A. ; SOUZA, Adelson Dias de ; PINA, Pablo Santos . Bioleaching and chemical leaching as an integrated process in the zinc industry. Minerals Engineering, v. 20, p. 591-599, 2007. 3.
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- SANTOS, Luciano Rodrigo Gomes ; SOUZA, Adelson Dias de ; BARBOSA, Alexandre Ferraz ; LEÃO, V. A. . Bioleaching of a complex nickel iron concentrate by mesophile bacteria. Minerals Engineering, Inglaterra, v. 19, n. 12, p. 1251-1258, 2006.
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- RODRIGUES, Rafael Falco ; TREVENZOLI, Rafael Lopes ; SANTOS, Luciano Rodrigo Gomes ; LEÃO, V. A. ; BOTARO, Vagner L . Adsorção de metais pesados em serragem de madeira tratada com ácido cítrico. Engenharia Sanitária e Ambiental, Rio de Janeiro, v. 11, n. 1, p. 21-26, 2005.
- ADÉLIA ; SILVA, C. A. ; LEÃO, V. A. . A PROPOSED MECHANISM FOR NITRATE AND THIOCYANATE ELUTION OF STRONG-BASE ION EXCHANGE RESINS LOADED WITH COPPER AND GOLD CYANOCOMPLEXES. Reactive & Functional Polymers, 2008.
- RAMPINELLI, Letícia Roni ; Azevedo, R. D. ; TEIXEIRA, Monica Cristina ; Guerr-Sá, R. ; LEÃO, V. A. . A Sulfate_o reducing bacterium with unusual growing capacity in moderately acidic conditions. Biodegradation (Dordrecht), 2008.



São Francisco Church

THANK YOU!

***MUCHAS
GRACIAS!***