

INTERNATIONAL ADVANCED MASTER® "MANAGEMENT OF POLLUTED SITES AND MINERAL WASTE PROCESSING/RECYCLING"

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The area of depollution is undergoing significant growth since 2000. The rehabilitation of polluted sites and soils was worth some 200 M€ in 2000, approached 500 M€ in 2010 and reached 560 M€ in 2012 (ADEME, 2013). After a two-year economic slowdown, a market analysis study (Xerfi institute, 2015) projected that the turnover of the companies concerned should grow by respectively 6 % in 2016 and 4 % in 2017. The regulatory backgrounds (in perpetual evolution) of the cutting back of raw materials (especially, metals) and the land resource (often situated in urban areas) optimization bring real growth opportunities to the sector.

Although the growth outlook is considerably stronger, the sustainable management of contaminated sites and soils remains an important challenge despite the significant progress identified in the last fifteen years. Processing techniques are constantly evolving and improving (to meet new legislation and new environmental challenges), as well as their implementation, with in particular more and more remediation activities conducted on site.

The training program will be specifically designed to answer to an identified expertise demand regarding mineral waste treatment schemes. It will provide tools to solve any shortcoming or challenge linked to the processing and recycling of contaminated mineral matrices (soils, sludge, sediments, excavated soil, by-products and waste) and will be aimed at developing teachings useful in proposing sustainable, integrated and economically rational solutions that address the full range issues posed by these materials since their on-site management until their evacuation, treatment and reuse. All this taking into account the environmental and sanitary impacts that their implementation, treatment and reuse cause.

The specificity of the SPIN ("Sciences des Processus Industriels et Naturels") centre of Mines Saint-Étienne lies in its multidisciplinary approach and orientation towards industrial processes. Under that feature, SPIN can propose an integrated, pragmatic and economically rational approach to the mineral waste concern covering the:

- expertise of existing processes and the proposal of alternative solutions that really fit the contamination type and local conditions through regular knowledge exchange and coordinated action with its clients;
- mineral waste characterization (development of diagnosis and monitoring tools) both in terms of heavy metals and organics to facilitate the most effective processing technologies choices;
- combination of treatment techniques (chemical, physico-chemical, hydrometallurgical, phytomanagement, etc.), which allow to widen the range of mineral matrices to process.

The proposed poster will underline the four teaching units of the Advanced Master® planned, that are devoted to the:

- characterization methods of contaminated sites and mineral matrices and diagnoses of pollution;
- existing processing/recycling techniques for sites and mineral waste;
- risks study (pollution transfers, environmental impacts, etc.);
- regulatory territorial, social and economic approaches intended to assist the rehabilitation of a contaminated site.