

Politecnico di Milano (POLIMI), Dept. Chimica, Materiali e Ingegneria Chimica

Justification of the “best value for money”:

The Politecnico di Milano (POLIMI) is one of the best scientific-technological university in Europe for industrially committed research. The PHOSave Project Manager M. Michelotti had his scholarship for PhD in Chemical Engineering and Industrial Chemistry at the POLIMI Department Chimica, Materiali e Ingegneria Chimica with Prof. Masi. **The collaboration between ProPHOS and Politecnico di Milano started in 2011, with services offered by POLIMI related to chemical analysis and chemical engineering consultancy. The collaboration continued in the last years with preliminary tests on extinguishing powder, to assess the technical feasibility of the new recovery method and the development of the first lab plants. This had a big impact on the selection procedure of the subcontractor.** Preliminary successful tests have been carried out at the lab plant and a recovering of 95% of the product (phosphate) was obtained. **One of the most innovative aspects of PHOSave project and essential contribution from Politecnico di Milano is the patent owned by POLIMI “Amphiphilic magnetic nanoparticles and aggregates to remove hydrocarbons and metal ions and synthesis thereof” (PCT/IB2015/053652). Access rights to the patent were already agreed for the project duration (next 2 years) and an agreement is under negotiation for the definition of the exploitation rights. POLIMI will provide to the project functionalized magnetic nanoparticles offering a high dissolution capacity for all the heavy organic compounds contained in the extinguishing powders. Besides POLIMI has also a huge expertise in Life Cycle Analysis that, in PHOSave, will assess the technological validation and environmental sustainability of the newly designed fire extinguishing powder recovery.** The complete POLIMI’s role in PHOSave is reported in the WPs description and the quotations (see table above) were carefully evaluated in terms of best price/quality ratio. All these represent the explanation why the subcontractor and the price are appropriate.

Profile

The Politecnico di Milano (POLIMI – website: <http://www.chem.polimi.it>), founded in 1863, is a scientific-technological university which trains engineers, architects and industrial designers. In figures, 15%, 19% and 41% of the graduates in Italy in the above disciplines, respectively. The University has always focused on the quality and innovation of its teaching and research developing a fruitful relationship with business and productive world by means of experimental research and technological transfer.



The department involved in this project is the Chemistry, Material and Chemical Engineering Department "Giulio Natta" (CMIC), founded in 2001 by merging of three previously existing Departments. The department has more than 100 academics, 50 administrative & technical employees, 120 temporary researchers. In the last national Evaluation of Research Quality (VQR), 2004-2010, held by ANVUR (National Agency for the evaluation of Universities and Research Institutes) the CMIC department was classified first in the field of “Industrial and Information Engineering”.

The CMIC Department is divided into four thematic sections: (a) Biological Engineering, (b) Chemistry, (c) Materials, (d) Chemical Engineering. The CMIC Department competencies fully covers these research fields being able to address the solution to almost any emerging problem ranging from the chemical synthesis and product design to the planning of production plants and processes, and the related environmental and safety

aspects. In detail the expertise and research focus on: new technologies to recovery raw materials, redefinition of the logistic cycles to recovery and use, definition of new processes and treatment technologies.

The CMIC department has a strong commitment in research together with small medium enterprises. Overall the CMIC department generates a yearly budget for research exceeding the 8 M€, being more than half coming from industrially committed research. The collaboration with the complex industrial scenario is demonstrated by projects with large national industrial manufacturing groups (Benetton, Luxottica, Radici Group, Medialario, Fincantieri), funding received by the Ministry for University and Scientific Research (FIRB project on innovative technologies and materials for the textile industry), as well as by European Union (SME Project on dry lubrication) and by Lombardy region (metadistricts).

Infrastructure and technical equipment:

The department can count on more than 30 research laboratories involved both in research and services to external companies:

- The Chemistry Section of the CMIC Department maintains state-of-the-art instrument facilities. Available analytical instruments include: NMR, GC/MS, HPLC/UV-Vis, FT-IR, X-ray spectrometers. In the Computational Laboratory, it's available access to national supercomputer centres and maintain a cluster of networked Silicon Graphics and Linux workstations for molecular modelling and scientific visualization.
- Advanced modelling tools, such as those developed in the frame of Computational Fluid Dynamics (CFD), Quantum Mechanics (QM), and Dynamic Process Simulation (DPS) are readily available. Experimental studies are supported by the CFALab (www.chem.polimi.it/cfalab), the Analyses Tests and Industrial Researches Lab. Modelling studies are supported by an 80 processors/45 nodes linux cluster, complemented with suitable software for quantum chemistry and computational fluid dynamics calculations.