

Politecnico di Milano

PhD in Materials Engineering

Research Title: New piezoelectric materials for innovative MEMS - Studio di materiali piezoelettrici per MEMS di nuova generazione

Scholarships and Financial support	
Monthly net income of PhD scholarship (max 36 months)	€. 1300
Number of scholarships	1
Beginning of PhD	01/11/2016
Deadline for application	05/09/2016
Context of the research activity	
Motivations and objectives of the research in this field	Synthesis of piezoelectric materials is of great interest for next generation of MEMS. Objective of the PhD will be the identification of piezoelectric materials based on lead, lead free and aluminum compounds. Such materials should be suitable for large scale application and easily integrated into existing production lines for MEMS. Main objectives of the research are: (i) development of sol-gel or vapor phase processes for depositing piezoelectric materials (ii) optimization of post treatment for achieving best piezoelectric performances (iii) definition of structure-properties correlations.
Methods and techniques that will be developed and used to carry out the research	Piezoelectric materials will be deposited by sol-gel or vapor phase processes according to the nature of the material. Morphological, chemical, mechanical and piezoelectric characterization will be performed on lab and pilot scale samples.

Educational objectives	Main objective is to give to the student tools to: (i) design and prepare formulation of sol-gel solutions for piezoelectrics; (ii) design and prepare piezoelectric materials by vapor phase methods (iii) characterize materials in term of piezoelectric properties.
Job opportunities	Job opportunities for the Research Doctor will be in private and public companies and institutes active in the field of MEMS, surface treatments and coatings, as suppliers or end users. Research Doctor from previous Cycle was hired by Solvay Specialty Polymers
Composition of the research group	Number of Full Professors 0 Number of Associated Professors 2 Number of Assistant Professors 0 Number of Post-Docs 1 Number of PhD students 6 Number of contracted researchers 3
Names of the research directors	<i>Prof. Luca Magagnin</i>
E-mail address, phone number and web-page	luca.magagnin@polimi.it – ph. +39 0223993124 http://www.chem.polimi.it/
List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research	1. ST Microelectronics
Additional support	
<u>Housing:</u> financial aid per PhD student per year (gross amount)	No
<u>Funding for educational activities</u> (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences): funding per PhD student per year	1 st year: € 0 euros per student 2 nd year: € 1370 euros per student 3 rd year: € 1370 euros per student
<u>Teaching assistantship:</u> availability of funding in recognition of support to teaching activities by the PhD student	There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.
<u>Computer availability:</u>	1 st year: individual use 2 nd year: individual use 3 rd year: individual use
<u>Desk availability:</u>	1 st year: individual use 2 nd year: individual use 3 rd year: individual use