



Tuesday, 17 February 2009

SALA BARBARA

5° Palazzo Uffici - Eni divisione E&P

Via Emilia 1

SAN DONATO MILANESE

11:00

NANOTECHNOLOGIES OPEN NEW FRONTIERS TO THE OIL INDUSTRY

C.F. Pirri – Politecnico di Torino

➤ ABSTRACT

In recent years a great growth in nanoscience and micro/nanotechnology areas occurred. Miniaturisation of devices, chip-based technologies, creation of sophisticated nanosized materials and chemical assemblies are already providing novel tools that are contributing to improve several industrial fields.

Nanotechnology is a highly interdisciplinary field, characterized by innovative collaboration between fields such as chemical engineering, materials science, applied physics, bio-chemistry, medicine, electrical engineering and mechanical engineering. Nanotechnology can offer innovative solutions for oil industry both in upstream and downstream with the “promise” of intelligent oil fields by using micro and nanoscale innovative sensors also probing properties deep in the reservoir. By building up substances at the nanoscale, we could produce equipment lighter, more resistant, and stronger. The extreme precision of nanoscale manipulation offers radically improved novel materials. There are numerous robust and temperature/pressure resistant nanotechnology applications already deployed or being developed for automotive, aerospace and military use which can offer a wide range of similar benefits for the oil industry. Drilling equipment and platforms can be made or coated with nanomaterials for improved capabilities such as corrosion-resistance, wear-resistance, shock-resistance, enhanced thermal conductivity, etc. Pollution by chemicals or gases is a difficult aspect of petroleum production, but the signs are that nanotechnology can make the industry considerably greener. Filters, membranes and particles are now being developed with a nanostructure that allows them to remove volatile organic compounds from oil vapor and mercury from soil and water.

New type of fluids, which can be labeled “smart fluids,” is becoming increasingly available to the oil and gas industry. In high-temperature/high-pressure conditions, old electrical sensors and other measuring tools often are not reliable.

➤ BIOGRAFIA

C.F. Pirri is Professor of Physics of Matter at the ICT Faculty of Engineering of the Polytechnic of Turin. From 1999 he is responsible of the Materials and Microsystems Laboratory of Politecnico of Torino (CHILAB), and in this framework he heads a Research Group working in the field of micro- and nano-science, actually composed by 50 researchers (<http://www.polito.it/micronanotech>). He is Coordinator, for the Polytechnic of Turin, of the International Master Degree in Micro- and nano-technologies for ICT (Master in Micro and Nanotechnologies for Integrated Systems, POLITO, INP Grenoble, EPF Losanne, <http://www.master-nanotech.com/>). In 2004 he is appointed representative for the Polytechnic of Turin for “Micro- and Nano-technologies” in the framework of Cluster Project, a pool of the most prestigious European Polytechnic Schools (<http://www.cluster.org/>). Since 2005 he is Director of the National MIUR Excellence Laboratory “LATEMAR” funded by FIRB 2003 call (<http://www.latemar.polito.it/>). His research activity is reported in more than 150 articles published in international journals.