fesr Basilicata 2007 | 2013

COMBINED LASER NANOTECHNOLOGY

Dr A. Guarnaccio, Dr D. Pietrangeli, Dr A. Santagata, Dr S. Orlando, Dr V. Marotta, Dr A. De Stefanis, Dr A. De Giacomo (Associate Bari University), Dr E. Lucia, Mr G. Parisi, Mr D. Conte, Mr D. Mollica.

Combined LAser Nanotechnology

LEAD PARTNER
CNR-IMIP - U.O.S. of POTENZA (Tito Scalo, Italy)

PROJECTS FOR THE EUROPEAN TERRITORIAL COOPERATION
AXIS II – KNOWLEDGE SOCIETY

MAIN OBJECTIVES

To strengthen the research based in Basilicata by defining and diffusing innovative laser-integrated methodologies for producing nanomaterials as well as performing their spectroscopic ultra-fast characterizations (100 fs laser pulse duration). Setting-up a virtual remote access (Remote-LAB) to scientific equipment of CNR-IMIP U.O.S. of Potenza.

NATIONAL AND INTERNATIONAL PARTNERS

University of **Bas**ilicata

Prof. R. Teghil, Dr A. De Bonis, Mr Galasso, Mr S. Laurita, Prof. M. D'Auria, Prof. R. Racioppi, Prof. G. Ricciardi.

Institute of **E**lectronic **S**tructure and **L**aser **F**oundation of **R**esearch and **T**echnology **H**ellas

Prof. D. Anglos, Prof. C. Fotakis, Dr P. A. Loukakos, Dr E. Stratakis, Mrs A. Klini.

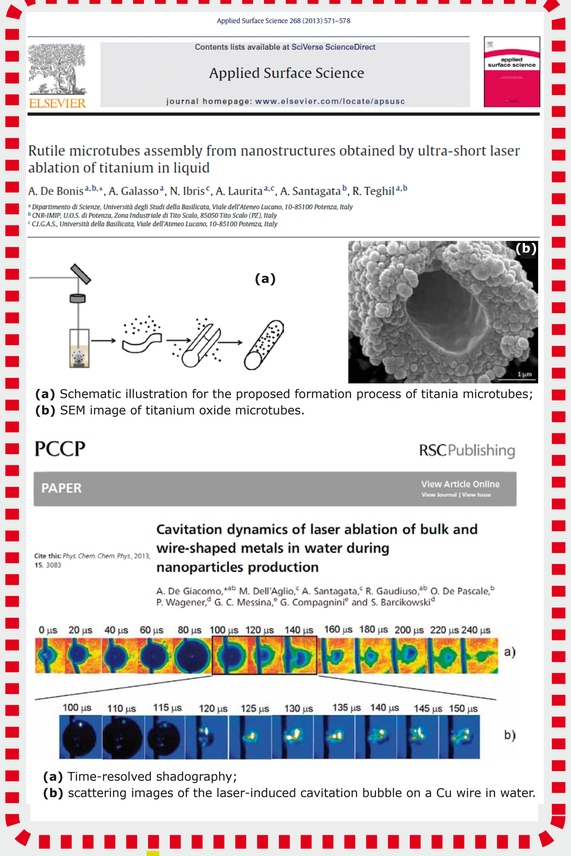
Chemical **R**esearch **C**enter **I**nstitute of **N**anochemistry and **C**atalysis

Prof. J. Valyon, Dott. O. Gyorgy, Dr M. M. Rosenbergené, Dr E. Talás, Dr G. Tolnai, Dr G. Zügner, Dr T. Firkala, Mrs M. Farkas.

KICK-OFF MEETING 12th July 2012
CNR-IMIP U.O.S. of Potenza

The project's objectives have been presented together with the scientific knowledge sharing approach to be followed and the role played by the partners. The European benchmark Institutions have had the opportunity of introducing their competences and organizations even to representatives of the Basilicata Region.

LASER ABLATION
Two papers published on ISI journals



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Rutile microtubes assembly from nanostructures obtained by ultra-short laser ablation of titanium in liquid

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(a) Schematic illustration for the proposed formation process of titania microtubes;
(b) SEM image of titanium oxide microtubes.

PCCP — RSC Publishing

PAPER — View Article Online

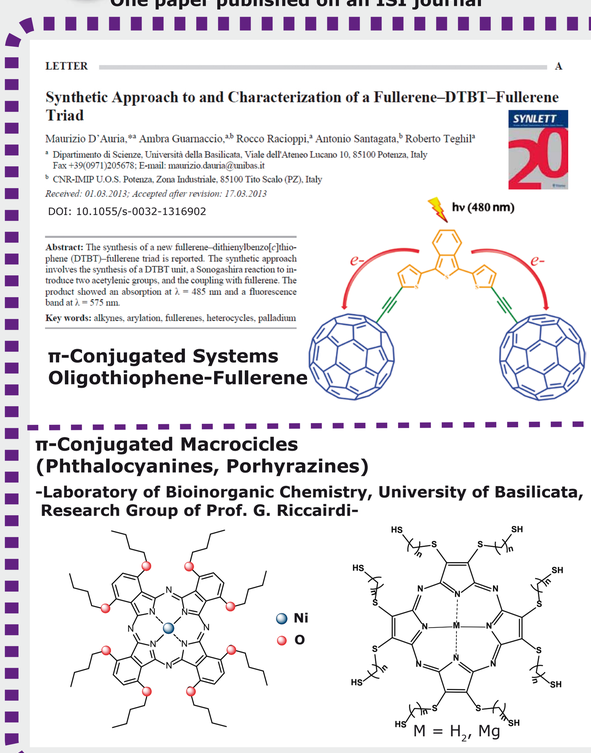
Cavitation dynamics of laser ablation of bulk and wire-shaped metals in water during nanoparticles production

Cite this: Phys. Chem. Chem. Phys., 2013, 15, 3083

A. De Giacomo,*[ab] M. Dell'Aglio,[c] A. Santagata,[c] R. Gaudiuso,[ab] O. De Pascale,[b] P. Wagener,[d] G. C. Messina,[d] G. Compagnini[d] and S. Barcikowski[d]

(a) Time-resolved shadography;
(b) scattering images of the laser-induced cavitation bubble on a Cu wire in water.

SYNTHESIS
One paper published on an ISI journal



LETTER — A

Synthetic Approach to and Characterization of a Fullerene–DTBT–Fullerene Triad

Maurizio D'Auria,*[a] Ambra Guarnaccio,[a,b] Rocco Racioppi,[a] Antonio Santagata,[b] Roberto Teghil[a]

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Abstract: The synthesis of a new fullerene–dithienylbenzo[*c*]thiophene (DTBT)–fullerene triad is reported. The synthetic approach involves the synthesis of a DTBT unit, a Sonogashira reaction to introduce two acetylenic groups, and the coupling with fullerene. The product showed an absorption at λ = 485 nm and a fluorescence band at λ = 575 nm.

Key words: alkynes, arylation, fullerenes, heterocycles, palladium

hv (480 nm)

e- e-

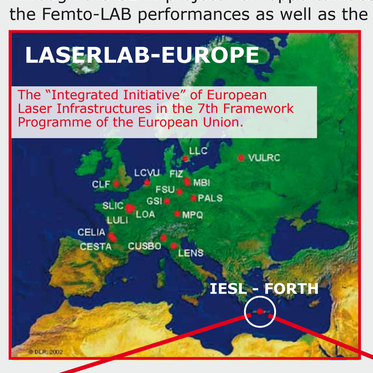
π-Conjugated Systems Oligothiophene-Fullerene

π-Conjugated Macrocicles (Phthalocyanines, Porhyrazines)

-Laboratory of Bioinorganic Chemistry, University of Basilicata, Research Group of Prof. G. Riccairdi-

FEMTO-LAB

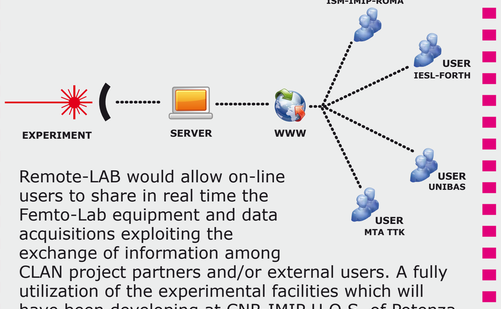
The Femto-LAB has been established with the aim of offering to researchers of the Basilicata Region a highly specialized and innovative laser Lab facility. Through the CLAN project new opportunities would be provided for enhancing the Femto-LAB performances as well as the skills of Lucanian young researchers in producing and characterizing by laser techniques (state-of-the-art approaches) the new nanomaterials obtained.



The IESL-FORTH is one of the European centre of excellence for laser research and belongs to the LASERLAB EUROPE network. Thanks to its own instruments and highly skilled researchers, the IESL-FORTH has been playing a relevant role in training the young researchers involved in the CLAN project and supervising both new experimental approaches planned and set-ups to be developed at the Femto-LAB of CNR-IMIP U.O.S. of Potenza.

The recent development of a new experimental set-up available at CNR-IMIP U.O.S. of Potenza involves an ultra-short pulsed laser (100 fs) coupled with a parametric amplifier (290-2500 nm) optical components and detecting systems which have been allowing ultra-fast spectroscopic characterizations of laser processed new nanomaterials. The following principal technique have been using: Time-Resolved Fluorescence (for photo-luminescent decay phenomena studies) and Pump-Probe Spectroscopy (for transient absorption of photo-excited electronic states).

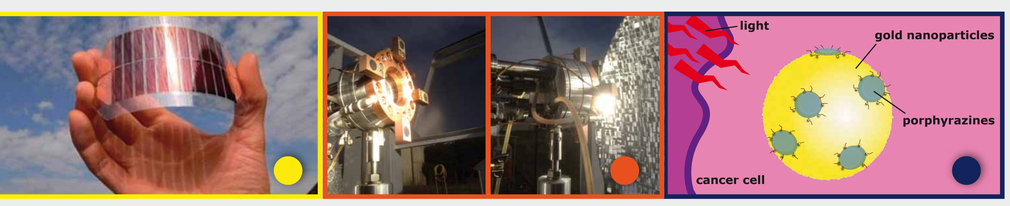
REMOTE-LAB



Remote-LAB would allow on-line users to share in real time the Femto-Lab equipment and data acquisitions exploiting the exchange of information among CLAN project partners and/or external users. A fully utilization of the experimental facilities which will have been developing at CNR-IMIP U.O.S. of Potenza would be offered to certified users.

TOPICS

- **Energy** (third generation photovoltaics)
- **Innovative materials** (nanostructured materials)
- **Health** (biomedical research)



TARGET GROUPS

- Public and private research centres;
- Universities;
- competence centres;
- service companies;
- spin-off;
- scientific-technological Scouting;
- Small and Medium Enterprises (SMEs).

OUTPUTS

- ✓ **Training of young researchers;**
- ✓ **development of experimental research methodologies;**
- ✓ **publications on international scientific journals;**
- join in with national and international scientific networks to increase knowledge and innovative expertises in the Basilicata Region;
- widen the "Messengers of Knowledge" scheme in order to enhance the know-how and the international scientific competences for a sustainable development of the Basilicata Region.

Regione Basilicata
Dipartimento Presidenza della Giunta
Autorità di Gestione del PO FESR Basilicata 2007/2013

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