EUROPEAN SYNCHROTRON RADIATION FACILITY

INSTALLATION EUROPEENNE DE RAYONNEMENT SYNCHROTRON

ESRF

Experiment Report Form

The double page inside this form is to be filled in by all users or groups of users who have had access to beam time for measurements at the ESRF.

Once completed, the report should be submitted electronically to the User Office using the **Electronic Report Submission Application:**

http://193.49.43.2:8080/smis/servlet/UserUtils?start

Reports supporting requests for additional beam time

Reports can now be submitted independently of new proposals – it is necessary simply to indicate the number of the report(s) supporting a new proposal on the proposal form.

The Review Committees reserve the right to reject new proposals from groups who have not reported on the use of beam time allocated previously.

Reports on experiments relating to long term projects

Proposers awarded beam time for a long term project are required to submit an interim report at the end of each year, irrespective of the number of shifts of beam time they have used.

Published papers

All users must give proper credit to ESRF staff members and proper mention to ESRF facilities which were essential for the results described in any ensuing publication. Further, they are obliged to send to the Joint ESRF/ ILL library the complete reference and the abstract of all papers appearing in print, and resulting from the use of the ESRF.

Should you wish to make more general comments on the experiment, please note them on the User Evaluation Form, and send both the Report and the Evaluation Form to the User Office.

Deadlines for submission of Experimental Reports

- 1st March for experiments carried out up until June of the previous year;
- 1st September for experiments carried out up until January of the same year.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report, in English.
- include the reference number of the proposal to which the report refers.
- make sure that the text, tables and figures fit into the space available.
- if your work is published or is in press, you may prefer to paste in the abstract, and add full reference details. If the abstract is in a language other than English, please include an English translation.

ESRF	**Reflectivity and X-ray fluorescence study of collagen – collagenolytic enzymes matrix metalloproteinases in monolayers at the liquid-solid interface**	**Experiment number**: SC-3169
Beamline: ID10B	**Date of experiment**: from: 15/06/2012 to: 21/06/12	**Date of report**: 16/01/12
Shifts: 18	**Local contact(s)**: Dr. Oleg Konovalov	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

1. **Victor Erokhin*, CNR-IPCF and Department of Physics, University of Parma, Italy.**
2. **Svetlana Erokhina*, Department of Physics, University of Parma, Italy.**
3. **Laura Pastorino*, Department of Communication, Computer and System Sciences, University of Genova, Italy.**

Report:

Permeability variation study in collagen-based polymeric capsules

Laura Pastorino, Svetlana Erokhina, Oleg Konovalov, Paolo Bianchini, Alberto Diaspro, Carmelina Ruggiero

Nanomedicine, the application of nanotechnoligies to healthcare, is promising area of nanotechnology which is promising extraordinary and far-reaching implications on human health both from diseases diagnosis and treatment points of view. As relates to diseases treatment, the possibility of developing new nanosystems for efficient drug delivery has attracted great attention. A prerequisite for nanotechnology based delivery systems, in order to be effective, is that the encapsulated drug molecules have to be released at the site of interest. One methods to obtain the specific release is based on the development of systems sensitive to disease associated over-expressed enzymes.

In this study we report on the fabrication of collagen based containers for drug encapsulation and release by cellular demand by the action of the collagenolytic enzymes matrix metalloproteinases (MMPs).Collagen is the major component of the connective tissue and it is involved in many biological functions. Its degradation is at the basis of different pathological processes. The up-regulated expression of MMPs is the causes for such degradation. Collagen based capsules were fabricated by the layer-by-layer technique and characterized by scanning electron microscopy and confocal microscopy. Real-time monitoring of the release kinetics of loaded gold nanoparticles, having different diameters, was done by total reflection X-ray fluorescence. Excitation of the fluorescence was performed by grazing incidence X-ray beam of synchrotron radiation. This study represents the first attempt in estimating the distribution and dimension of pore size in polyelectrolyte nanoshells.

BioNanoScience, 1, 192-197 (2011).