

Drugs and biological processes under investigation through neutrons



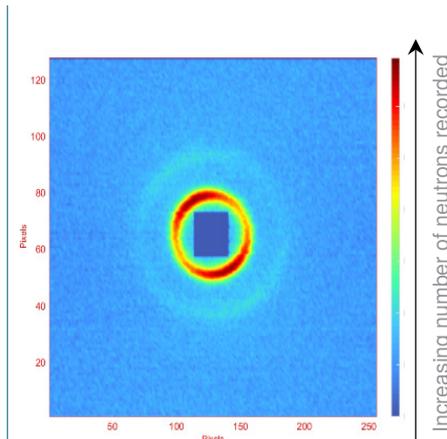
- ✓ No radiation damage
- ✓ Unique for the study of H-bonds
- ✓ Solvent / molecule contrast easily obtained

Small angle neutron scattering SANS

can probe structures in the range of 1 nm to about 1 μm , that have no particular ordering. Examples: localisation of guest molecules (targeting agents, drugs) inside liposomes, characterisation of nanocarriers (e.g. overall size, monodispersity, stability with time, temperature or under specific pH and ionic strength), molecular transport in membranes, mechanisms of molecular self-assembly in solutions, structure and interactions in colloidal suspensions, micro-emulsions, micelles.

Neutron reflectometry is a technique for measuring the structure of thin films and layered structures from 1 nm to several hundreds of nm in thickness. It provides structure of the surface (e.g. determination of the morphology and localisation of proteins at interfaces), including the thickness, density, and roughness.

Neutron crystallography is utilised in order to locate individual protons of special interest without damaging samples. Studies typically address questions concerning enzyme mechanisms and drug or ligand-binding interaction. Depending on the instrument and unit-cell edge, data collection is feasible from volume of about 0.05 mm^3 .



This image shows the neutrons scattered from a **micro-emulsion**. This is the kind of image that enables the microstructure of fluids or solids to be determined!

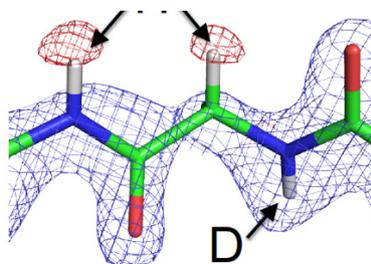
Credit ILL



Gel coated titanium surface binds proteins which promote bone formation.

The process was observed in real time using neutron reflection to track the amount of protein at the surface.

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A 3D structure of the HIV-1 protease. Drugs bind to their target molecules via H-bonding and hydrophobic interactions => to improve drug efficacy and reduce drug resistance we need to be able to visualize these interactions.

Credit M. Blakeley & N.Coquelle (ILL)

Neutrons for Industry

<http://sine2020.eu/industry.html>

Neutrons for Industry

industry@sine2020.eu

SINE2020 Industry Consultancy is now open for requests.

Proof-of-concept experimental beam time is being offered to Industry!

RAPID ACCESS

Fast-stream processing for industrial applications, optimising result lead times.

CONFIDENTIALITY

Activity covered by non-disclosure agreements. Only company name and measurement type to be published.

FLEXIBLE SERVICES

In many cases industrial processes and conditions can be re-created in the test laboratory. Final data analysis and reporting are provided.



EXPERT CONSULTANCY

Industrial R&D professionals in collaboration with experienced specialists from European neutron centres.

PARTNERS FROM:

Czech Republic, France, Germany, Hungary, Netherlands, United Kingdom.



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