MATERIALS CHARACTERISATION WITH A DIFFERENT VIEW

Many grand societal challenges require solutions that depend on the development of innovative materials.

Materials design is enhanced by advanced characterisation techniques that offer insight into the structures and interactions underpinning material properties.

Neutron scattering is a powerful and versatile set of techniques that can be used to study a variety of materials over a range of length and time scales.

Neutrons are produced at centralised research facilities that provide specialist instrumentation, scientific and technical expertise to users across the world.

Neutron science is delivering important socioeconomic impacts by enabling progress in fundamental and applied science.

WHY USE NEUTRONS?

Neutrons have a variety of properties that are powerful for materials characterisation.

STUDY DYNAMICS

Neutron energies are comparable to the time scales of molecular diffusion, vibrations and rotations.

STUDY STRUCTURE

Neutron wavelengths are comparable to the spacings of atoms and molecules.

PENETRATION POWER

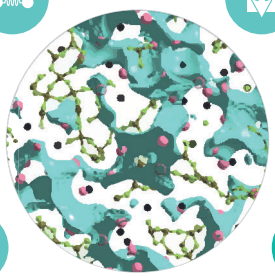
Neutrons can penetrate deep into matter (including many different metals) enabling the study of large samples - even within complex sample environments.

STUDY MAGNETISM

The neutron's magnetic moment can be used to study the microscopic magnetic properties of materials.

NON-DESTRUCTIVE

Neutrons are suitable for the characterisation of delicate and precious samples, including biological materials.



VERSATILE SAMPLE ENVIRONMENTS

Sophisticated sample environments enable studies under operating conditions, including extreme temperatures and pressures.

SENSITIVITY TO LIGHT ELEMENTS

The neutron scattering power of nuclei varies in a quasi-random manner such that lighter atoms (e.g. H, Li) can be studied in the presence of heavier ones.

COMPLEMENTARITY

Neutron scattering is highly complementary to other techniques, such as X-ray scattering, electron microscopy, magnetic resonance and computational methods.

ISOTOPIC CONTRAST

Neutrons are sensitive to different isotopes of the same element, so isotopic substitution (e.g. H/D) can be used to highlight specific features.

ABOUT THE LENS INITIATIVE

The League of advanced European Neutron Sources (LENS) is a non-profit collaboration that is working to strengthen neutron and muon science in Europe.

Find out more:

www.lens-initiative.org

contact@lens-initiative.org

@LENSinitiative

LENS LEAGUE OF ADVANCED EUROPEAN NEUTRON SOURCES