

X-Ray Powder Diffractometer (XRD)

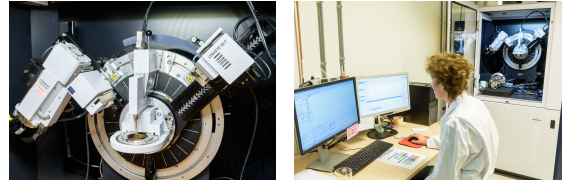
<https://labfacilities.wur.nl/SearchDetail.aspx?deviceid=47449d6d-bf2d-450f-831c-1e40109ac915>

Brand

Bruker

Type

D8 Advance



Contact

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Organisation

Agrotechnology & Food Sciences Group

Department

Environmental Technology

Description

X-ray diffraction is a versatile and non-destructive analysis method for the determination of material properties such as phase composition, structure and texture of powders, solids and liquids. Depending on the composition, X-ray radiation will be diffracted in a specific way in samples due to the regular distribution of atoms in a crystal. The diffraction pattern provides information about among others phase, crystal structure and crystal size.

Technical Details

BrandBrukerGoniometerD8 ADVANCE Theta/ThetaMeasurement circle560mmTube2.2 kW Cu long fine focusTube Power40 kV / 40 mAPrimary opticsMotorized divergence slitsSoller slitsGobel MirrorSample stageStandard rotation stage with Motorized Air-Scatter KnifeAnton Paar TTK600 temperature chamber UMC- stageCapillary stage; standard goniometer headSecondary opticsSoller slitsDetectorLYNXEYE_XE_T, 3°opening

Applications

- Identification of the crystal (by comparison with data from a database).
- Identification and characterisation of solid crystalline materials (including multi-phase mixtures).
- Determination of purity of crystals.
- Small Angle X-ray Scattering (SAXS): determine nanoparticle size distributions, resolve the size and shape of (monodisperse) macromolecules, determine pore sizes, characteristic distances of partially ordered material.
- Wide Angle X-ray Diffraction (WAXD): the determination of the crystallinity of polymers such as polyesters, polyamides, and in cellulose and starch.
- Wide Angle X-ray Diffraction (WAXD): the determination of the size and phase of metal nanoparticles as well as the support materials in heterogeneous catalysts
- X-Ray Reflectometry (XRR): determination of layer thickness (0.1 nm-1000nm)
- Measuring XRD patterns at different temperatures
- Measuring XRD patterns in transmission mode with capillary sample holder.

Publications

Fate of calcium, magnesium and inorganic carbon in electrochemical phosphorus recovery from domestic wastewater, Yang Lei, Ipan Hidayat, Michel Saakes, Renata van der Weijden, Cees J.N. Buisman, , <https://www.sciencedirect.com/science/article/pii/S1385894719300646>

Particle size control of biogenic scorodite during the GAC-catalysed As(III) oxidation for efficient arsenic removal in acid wastewaters, Silvia Vega-Hernandez , Jan Weijma , Cees J.N. Buisman, , <https://www.sciencedirect.com/science/article/pii/S2212371719301003>

Anaerobic biodegradation of pharmaceutical compounds coupled to dissimilatory manganese (IV) or iron (III) reduction, Wenbo Liu, Nora B. Sutton, Huub H.M. Rijnaarts, Alette A.M. Langenhoff, , <https://www.sciencedirect.com/science/article/abs/pii/S0304389418303340>

Calcium phosphate granulation in anaerobic treatment of black water: A new approach to phosphorus recovery, Taina Tervahauta, Renata D. van der Weijden, Roberta L. Flemming , Lucía Hernandez Leal, Grietje Zeeman , Cees J.N. Buisman, , <https://www.sciencedirect.com/science/article/abs/pii/S0043135413007902>

Synthesis and characterization of a supported Pd complex on carbon nanofibers for the selective decarbonylation of stearic acid to 1-heptadecene: the importance of subnanometric Pd dispersion, Elba Ochoa, Wilson Henao, Sara Fuertes , Daniel Torres, Tomas van Haasterecht, Elinor Scott, Harry Bitter, Isabel Suelves, Jose Luis Pinilla, , https://www.researchgate.net/publication/340614850_Synthesis_and_characterization_of_supported_Pd_complex_on_carbon_nanofibers_for_the_selective_decarbonylation_of_stearic_acid_to_1-heptadecene_the_importance_of_subnanometric_Pd_dispersion

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Magnetite synthesis from ferrous iron solution at pH 6.8 in a continuous stirred tank reactor, Yvonne M. Mos, Karin Bertens Zorzano, Cees J. N. Buisman, Jan Weijma, , https://www.researchgate.net/publication/323191696_Magnetite_synthesis_from_ferrous_iron_solution_at_pH_68_in_a_continuous_stirred_tank_reactor

Natural Deep Eutectics as a "Green" Cellulose Cosolvent, Huy Vu Duc Nguyen, Renko de Vries, Simeon D. Stoyanov, , <https://pubs.acs.org/doi/abs/10.1021/acssuschemeng.0c04982>