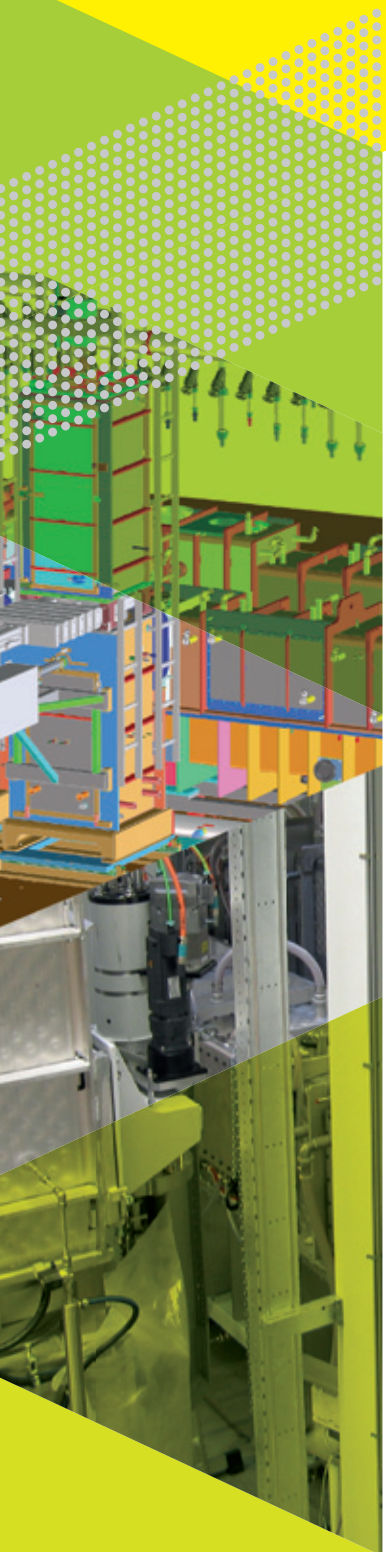
ECN
Your energy. Our passion.



Materials analysis and Characterisation

"The structure determines"

What are the characteristics of my material or product? Does it evaporate? Is it clean? Does it bind gases? Have the characteristics changed as a result of the production or processing? How strong is it? Are homogeneity and density in accordance with the specifications? What are the exact measurements of my product? ECN can determine all these characteristics for metals, ceramics, plastics and composites.

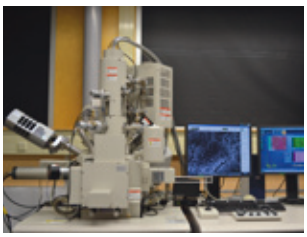
What can ECN do for you?

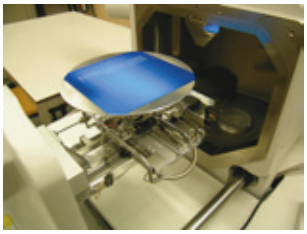
- Physical characterisation
- Mechanical testing
- Chemical analysis
- Optical measuring
- Optical and Electron microscopy (SEM)
- Geometrical measurements

Not only will we send you the measuring results; you can also ask us questions about the results. Direct contact with our experts enables you to realise a practical follow-up.

State of the art equipment/applications

- Electron Microscopy (SEM) with resolutions starting at sub-nanometre and suitable for large components with EDS/WDS full chemical analysis and with EBSD structure
- Confocal microscope
- Atomic Force Microscope (AFM) surface roughness resolution up to 3 nm
- Thermal analyses: Thermo-gravimetry, (High Pressure) DSC (Differential Scanning Calorimetry), Dilatometre
- Gas adsorption: Thermo-gravimetry, high pressure, specific surface, porosity, chemisorption.
- Skeletal density, FTIR, viscosity, shear stress, complex moduli
- Qualitative and quantitative gas analysis, particle size distribution
- Mechanical testing: tensile and compressive tests (up to 900°C), rotating fatigue, hardness measurements
- Geometrical 3D measurements, mechanical and optical
- Composition analyses of materials, in solid, liquid and gaseous stage, using techniques such as chromatography, mass spectrometry and ICP analysis





Our equipment and applications are continuously renewed and/or expanded to enable high-level research and development. For an up-to-date overview, please visit www.ecn.nl/units/es/additional/brochures/

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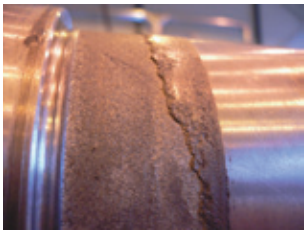
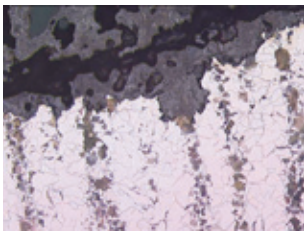
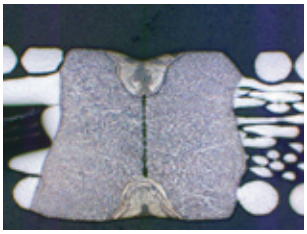
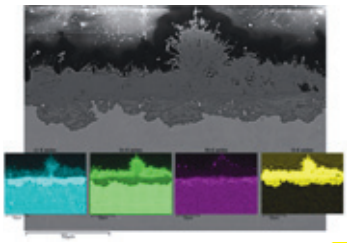
Materials, testing & analysis

Are you faced with a problem in your installation, process or product? In most cases, the ECN experts can solve this together with you. Our group of complementary specialists covers a broad knowledge area, enabling us to help you quickly with practical solutions or clear advice.









We can offer you the following expertise:

- Failure analysis
- Corrosion analysis
- Materials engineering
- Joining technology
- Manufacturing technology

Strong solutions

ECN can solve both complex and more practical engineering issues. We have built many pilot set-ups and installations that involved extremely highly demanding process conditions. They involve deployment of chemicals, high or low temperatures and/or high or extremely low pressure. Required process purity and interaction with media (fluids/gases) are also critical.

Solutions are often found through practical combinations of different materials such as glass, ceramics and metals. This way the special process demands can be met in a cost-effective manner.

Common material combinations are:
- Construction materials such as high-strength steels and high alloys
- Refractory metals and ODS steels
- Aluminium, non-ferrous materials
- Composites
- Glass and quartz
- Ceramic materials
- (Fibre reinforced) graphite
- (Fibre reinforced) plastics
- Coatings; organic, hybrid and inorganic

References

We are a valuable partner for small and medium-sized businesses, but also for multinationals in the following markets: the energy sector (nuclear, biomass, solar, wind), aviation, aerospace, offshore, defence, process industry, environment and infrastructure. Our clients comprise the following organisations: Fokker, Alcoa, CEA, Soterem, Stork, ASML, FEI, Shell, Friesland Campina, Bravilor, RGS, Covidien, NRG, EADS, ITER, CERN and Attero.