

CERAM

www.ceram.com



Independent Materials Testing,
Analysis and Consultancy

CERAM



An independent global expert in materials testing, analysis and consultancy.



We apply our expertise and capabilities to a wide range of industries, including:

- **Aerospace & Defence**
- **Automotive & Transport**
- **Construction**
- **Consumer & Retail**
- **Electronics**
- **Energy & Environment**
- **Healthcare**
- **Materials Manufacturing**
- **Minerals**
- **Refractories.**

We pride ourselves on providing:

- **Independence**
- **Confidentiality**
- **Quality**
- **Added value**
- **Expertise**
- **Technology**
- **Speed of service**
- **Innovation.**

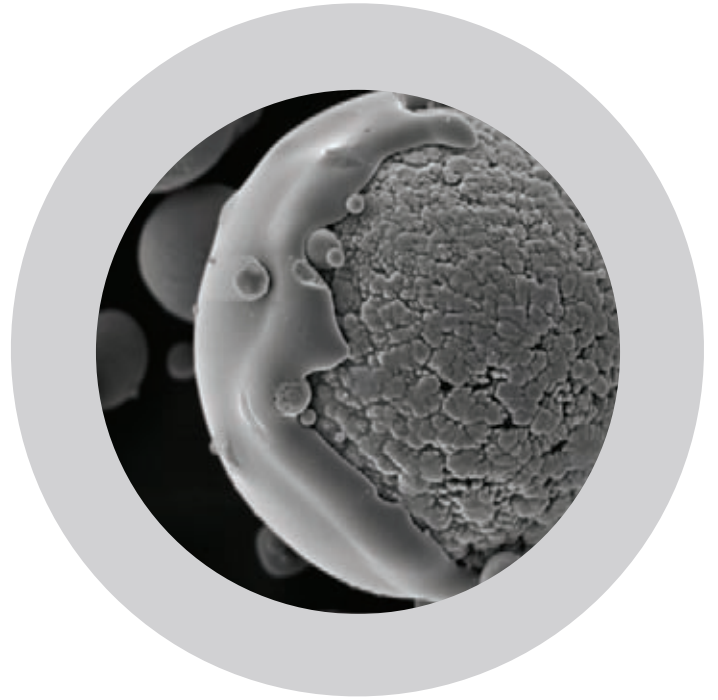
Headquartered in Staffordshire, UK, **CERAM** has accredited laboratories and offices around the world and employs a team of research and product development professionals who specialise in physical and chemical materials testing, research, process engineering, failure analysis and product design. Our extensive and diverse knowledge of materials, products and processes is unique, making us ideally placed to provide cost effective, real working solutions to your problems.

Tel: +44 (0)1782 764428

**Tel (UK customers):
0845 026 0902**

Web: www.ceram.com

Email: enquiries@ceram.com



Our testing and analysis service will help you to validate your products and processes to national and international standards.

Testing & Analysis

We are a UKAS accredited testing laboratory No. 0013 in the UK and have **CERAM** accredited overseas laboratories. With some of the most up-to-date equipment of any laboratory in the UK, we have a comprehensive suite of capabilities for solid, powder, liquid and gas analysis and testing. Our highly qualified, experienced staff can conduct routine conformity and bespoke testing and analysis for:

- Building products testing
- Building structures testing
- Ceramic testing & analysis
- Chemical analysis
- Environmental analysis
- Failure analysis
- High temperature performance testing
- Microstructural analysis
- Mineralogical analysis
- Physical & thermal testing
- QA/QC
- Refractory materials testing
- Retail products testing
- Slip resistance testing
- Surface & coating analysis.

Consultancy

Our technical consultants work throughout all stages of the product and process lifecycle to help you improve performance, comply with regulations, solve problems, gain a competitive advantage and increase profitability.

We offer a wide range of services, including:

- Product/component development & evaluation
- Processing support & optimisation
- Failure analysis & diagnosis
- Technical information searches
- Expert Witness
- Sustainability services
- Outsourcing
- Training
- Certification.

These can be accessed through individual contacts, Membership or our unique Technology Partnerships.



We service a wide range of industries

Automotive & Transport

Using the latest techniques and state-of-the-art equipment, we independently test automotive materials, such as composites, ceramics, polymers, elastomers, metals and textiles, for safety, performance, reliability, legislative and improvement reasons, to international, customer and industry standards.

Case Study: Surface Characterisation of Gas Turbines

Goodrich Corporation asked **CERAM** to measure the concentration of chromium oxidation states in the chromium present on a test coating used in gas turbine applications, in support of new product development efforts.

The measurements were conducted using X-ray Photoelectron Spectroscopy on a specific pre-treatment of the coating surface (depth <10nm). **CERAM** supplied analytical results of individual chromium oxidation state species to an accuracy of 0.1%.

Goodrich was provided with an absolute measurement of the quantitative composition of the oxides of chromium in the coating surface and therefore saved potential company investment in non-fruitful areas of development.

Aerospace & Defence

Our materials expertise in the Aerospace and Defence sectors includes: advanced ceramics; metals; alloys; super alloys; composites; processing, fabrication, joining, welding and bonding know-how and capabilities; surface and coating characterisation; and corrosion analysis.

Projects we've been involved in:

- Design and development of thermal barrier coatings, layers and components
- Analysis of high temperature materials, e.g. for use in turbine blades
- Materials innovation for stronger and lighter protective personnel and vehicle armour
- Materials selection, integrated component design and testing for extreme temperature and shock in operation
- Surface contamination analysis and solution design for PCB manufacture
- Rational materials selection and design for minimised environmental impacts
- Guidance on materials selection and design for legislation
- Detailed material failure analysis of engine and airframe components.



Consumer & Retail

We offer manufacturers, importers and retailers: material formulation, competitor product analysis, packaging and product failure analysis, legislation conformity and compositional analysis, identification and quantification.

Case Study: CERAM Expertise is a Winner with IKEA

Swedish retail giant IKEA appointed **CERAM** as their preferred consultant for worldwide ceramic product sourcing.

CERAM has played a pivotal role in helping IKEA develop and install quality control systems in their factories and adhere to standards through product and conformance testing.

Jan Andersson, Ceramics Quality Manager of IKEA, commented:

*"By choosing **CERAM** as our preferred consultant, IKEA has the advantage of having just one contact that can offer a wide variety of competences, including both skilled technical field personnel and R&D testing capability."*



Construction

From raw materials and building products to full scale structures, whether new or redevelopment projects, on or off-site, we have the expertise, specialist purpose-built testing facilities, knowledge of current regulations and industry experience to work with you to optimise the performance of materials, buildings and structures.

We can help you to:

- Improve performance
- Develop novel products and processes, and improve existing ones
- Comply with regulations and meet specifications
- Solve problems
- Realise products and projects from conception.

"Our technical expertise, extensive testing facilities and experience in providing both standard and bespoke solutions to construction problems, together with involvement in regulatory, standards and certification issues enable us to provide a comprehensive service to construction clients."

Dr. Geoff Edgell, Director and Principal Consultant, Construction

Energy & Environment

We offer materials and testing capabilities to waste processors, energy producers, energy providers and energy users to develop new technologies and source alternative fuels through clean technology development, sustainability services and environmental analysis.

We are able to provide:

- Testing and analysis for a range of alternative fuels, including: biogas, biomass, secondary liquid fuels and landfill gas
- Analysis solutions for gas engine manufacturers and end users
- Energy management support
- Carbon emission reduction through the development of clean technologies.

"Thanks to our ability to provide tailored solutions, we can offer monitoring and testing solutions that will suit the individual requirements of customers in the energy and environment industry."

Stuart Watson, Organics Team Leader

Electronics

We work with international organisations in the semiconductor and electronics industries on wafer, device, component and PCB issues, providing solutions to in-house problems and field failures.

Our surface and micro-analytical techniques are critical for:

- Assessing starting material quality
- Qualifying production tools
- Monitoring dopant levels
- Solving yield issues
- Cleanroom and wafer contamination
- PCB defects and field failures
- Soldering and disbondment.

Projects we've been involved in:

- Investigation of poor solder wetting on gold bond pads by XPS and DSIMS
- Investigation of a corrosion problem on field-return PCB samples
- ULE-SIMS depth profiling analysis of Ge in SiGe layers
- High resolution SIMS measurement of boron delta layers
- Deep Backside SIMS analysis of boron, phosphorus and arsenic in a device sample
- Determination of surface contaminants on silicon wafers by XPS and ToFSIMS.



Materials Manufacturing

We provide materials manufacturers with a full suite of tests and quality control procedures.

Some of the services we offer:

- Refractory services
- Materials analysis & characterisation
- Waste & environmental analysis
- Testing services
- Failure analysis
- Cleanliness validation
- Surface & coatings analysis
- Chemical analysis
- Product & process optimisation
- Powder processing.

Case Study: Kitchen Towel Surface Characterisation

SCA Research AB approached **CERAM** regarding a project to optimise performance of the Proctor & Gamble product, Bounty kitchen towel.

The loading and location of the wet strength additive were determined for three treatment levels using SIMS imaging and compared with a competitor sample. The study quantified the process control parameters and confirmed that the additive accumulates at fibre cross-over points.

The client was able to demonstrate additive effectiveness which both strengthened the product claims in promotional material and optimised process efficiency.

Healthcare

We help medical devices, medical equipment, consumer healthcare and pharmaceutical manufacturers and suppliers through:

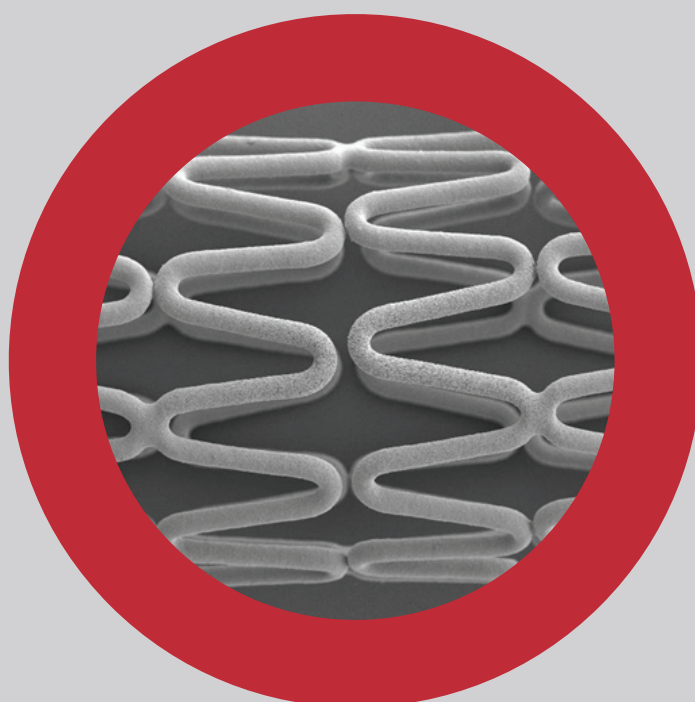
- Materials characterisation and formulation
- Concept, prototyping and product design
- Performance and quality testing
- Manufacturing and processing optimisation and support
- Product claim support
- After-use evaluation and failure analysis.

Case Study: Cleanliness Validation of Orthopaedic Implants for Joint Replacement Instrumentation Ltd (JRI)

JRI specialises in orthopaedic implants and instrumentation. After relocating their manufacturing facilities, **CERAM** was asked to independently verify that the newly installed degreasing and cleaning lines were not compromised by the relocation of the manufacturing processes.

To analyse the surface of the products we used a combination of surface analysis techniques - SEM/EDX and XPS.

CERAM's independent 'Validata' analysis showed the new degreasing and cleaning lines to be superior to the old lines with a reduction in surface contamination.



Minerals

We support extractors, processors and those who use minerals by providing:

- Chemical analysis for material identification and characterisation
- Mineralogical analysis for quality control monitoring
- Physical testing to confirm product specification properties
- Processing support
- Effective waste recycling
- Performance augmentation
- Audits for problem solving
- Alternative supplier comparisons
- Deposit evaluation.

*“Due to **CERAM**’s materials expertise, we offer a comprehensive suite of testing and characterisation for the minerals industry, thus enabling you to benchmark, monitor and improve mineral quality, whether for extraction, evaluation, production or application purposes.”*

Dr. Richard White, Head of Testing

Refractories

We provide clients from a range of applications in high temperature industries with manufacturing and quality improvements, extended refractories campaign life through assessments and audits, analysis and rectification of refractory failures, refractories quality audits, specification and design criteria.

Projects we’ve been involved in:

- Investigations and recommendations for improving size tolerances during the brick manufacturing process at different suppliers
- Failure investigation of glass furnace regenerators
- QC of materials for use in critical applications, e.g. multiple hearth units
- Lining failure investigation following pressure vessel shell hot spot development
- Twenty-four hour chemical analysis turnaround to determine origin of loose refractory materials in a Fluid Catalytic Cracking Unit (FCCU)
- Manufacturer evaluations to assist end users with decisions when seeking potential suppliers.



We offer a wide range of services

Information Services

Our Information Centre is a unique source of ceramics and materials information providing up-to-date technical, commercial and market information as well as a range of support services.

We provide:

- Journals, books and conference proceedings, international and European standards
- An environmental information service and guidance
- A customised, structured, search service carried out by an Information Specialist, utilising a comprehensive range of databases
- A menu-driven alert service for continuous monitoring of new information and developments
- **CERAM** Knowledge Base - online access to hundreds of pages of technical information
- World Ceramics Abstracts – an online database produced by **CERAM** containing over 190,000 records.



Computational Modelling

We combine state-of-the-art modelling software with specialised engineering know-how and in-house physical testing to provide a one-stop shop for:

- Material selection and concept design
- Performance improvement
- Processing and manufacturing support
- Failure analysis
- Lifetime prediction
- Research and development.

Projects we have been involved in:

- Thermo-mechanical analysis of refractory structure design
- Calculating ceramic component stresses for high temperature aerospace applications
- Determining the cause of thermal shock failure of industrial components
- Predicting the deformation of whiteware products during manufacturing
- Research and development in the application of modelling for material development
- Improvement of manufacturing production through design optimisation.

Sustainability

We are able to help with a broad range of sustainability services, including: energy management, waste management, alternative raw materials and carbon management services.

Projects we've been involved in:

- MARSS Survey - alternative, recycled and secondary raw materials survey undertaken yearly on behalf of the UK brick manufacturing sector
- Alternative uses for manufacturing "waste" streams into construction products
- Assessment of bio-fuels and landfill gas analysis
- Assessment of waste for Waste Acceptance Criteria
- Manufacturing process optimisation to enable energy reduction
- Carbon footprinting manufacturing processes.

Research & Development

Drawing on our wide-ranging technical and project management expertise, we are well placed to help you develop new products and services. Recent innovations include:

- A new way of measuring slip resistance, which takes into account the many factors affecting "slip potential", such as footwear, cleaning procedures, environments and human behaviour - helping companies reduce the risk of slip accidents
- The development of controlled release systems using glass technology to deliver nutrients and other active agents under highly specified conditions
- A systematic approach to selecting additives for ceramic manufacturers which sets out simple rheology tests and protocols to identify the best systems for effective processing
- Methods of authenticating items and providing traceability through high temperature processes.



Expert Witness

Our Expert Witness Service draws on the expertise of a core team of internationally regarded professionals, each with their own specialist knowledge.

All of our expert work is carried out under the Civil Procedure Rules Part 35 or equivalent depending upon the jurisdiction, and supported by our fully independent UKAS accredited testing laboratory No. 0013 and the **CERAM** Information Centre.



“Establishing a Technology Partnership with CERAM has enabled us to leverage our combined knowledge and experience and create projects that provide our customers with cutting edge materials intelligence to help them make better, more informed product choices.”

Keith Parker, Marketing Director for
Morgan Technical Ceramics

Membership & Technology Partnerships

We offer a range of Membership & Technology Partnerships which provide access to products and services designed to assist manufacturers, suppliers and end users.

The benefits of Membership & Technology Partnerships:

- Direct access to a range of experts involved in cutting edge material technology development
- Access to information through the world's largest ceramics, materials and environmental data facilities to answer your needs for technical or commercial data
- Access to the **CERAM** Knowledge Base
- A proportion of your subscription reserved to fund projects of your choice
- Discounts on products and services supplied by **CERAM** including consultancy and testing
- Entry to our technical programmes and committees.

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