

artis

stretching the limits

POLYMER RECYCLING

ARTIS have identified the polymer recycling industry as a key driver for future growth. Our aim is to stimulate the growth of your business through innovative technologies and material development. Whether it is improvement in properties for a specific application or development of a material with high recycle content ARTIS have the people and expertise to make a difference to your business.

DEVELOPMENT SERVICES

ARTIS offer a wide range of development services to clients, suppliers, buyers and end users. Our industry experts have the necessary skills and experience to deliver successful consultancy services from basic property testing, through to complex chemical analysis, turnkey failure analysis and product development projects.

AUTOMOTIVE INDUSTRIES

Through its long association with Avon Rubber p.l.c. ARTIS has a comprehensive library of industrial and academic rubber formulations for automotive applications. In addition we welcome requests for custom formulation development for new applications.

DEFENCE

ARTIS can offer support to the defence industries through our experience with Avon Rubber p.l.c. and through its wider knowledge and experience of materials development.

INDUSTRIAL AND CONSUMER

ARTIS have developed compounds and provided data to help our customers succeed in their chosen markets, including those in the dairy or food industry, gaskets for the aerosol industry, rail pads, shoesoles and car mats.

RECYCLING

REGENERATION AND INNOVATION



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CRUMB ANALYSIS

Unique methods for crumb analysis have been developed to provide data on:

- Particle size distribution
- Particle surface structure
- Surface chemistry
- Particle surface area

We can also benchmark your competitor materials.

RECYCLED CONTENT MATERIAL DEVELOPMENT

We can evaluate the effect of a range of recycled materials either as a matrix for a composite structure or as a filler in a thermoplastic or thermoset matrix.

From a simple evaluation of mechanical properties to an extensive investigation of the fundamental interaction between recycle and matrix, ARTIS can provide the information needed to successfully develop your business.

OPTIMISATION OF RECYCLED CONTENT

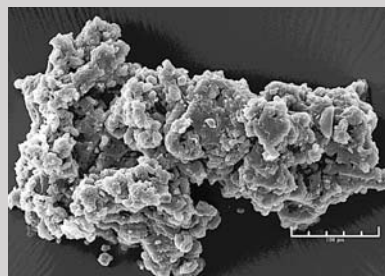
As recycled content is increased in a material the fundamental properties will change. Often there are conflicting requirements for a particular application. Using sophisticated experimental design methodologies ARTIS can optimise your formulation for a single or combination of properties.

COMPETITOR MATERIAL ANALYSIS

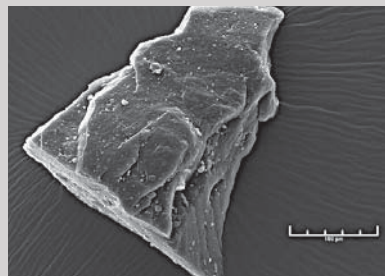
There is no wiser business advice than knowing what your competition is doing. With our range of advanced chromatography, spectrometry, thermal and imaging techniques we can evaluate and give you a complete breakdown of your competitors materials. ARTIS can then engineer a formulation and mix material on a laboratory scale to give you an equivalent to match the performance.

CASE STUDY

SEM analysis of crumb rubber from two different sources showed striking differences in surface morphology. When incorporated into formulations to reduce costs these two types of crumb gave different final properties.



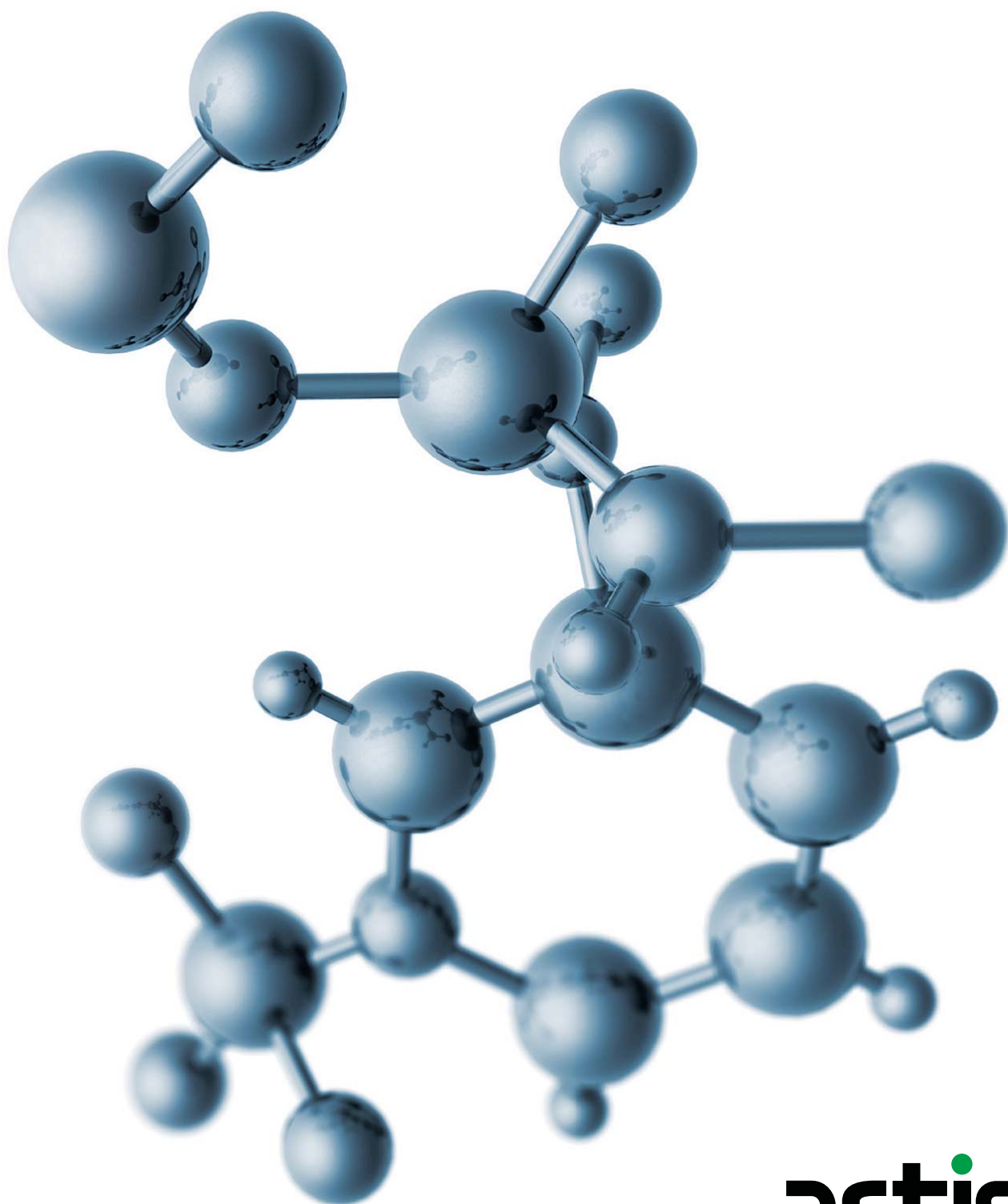
SOURCE
1



SOURCE
2

SERVICES

EXPLORING MATERIAL SCIENCE



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EXPLORING MATERIAL SCIENCE

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Our material experts have the skills and experience to deliver successful consultancy services from basic property testing, through complex chemical analysis to turnkey failure analysis and product development projects.

PHYSICAL AND MECHANICAL TESTING

ARTIS can perform routine mechanical property tests on a range of elastomeric, polymeric and composite materials.

- Testing conducted to a range of national and international standards
- Custom and product tests can be tailored to individual company requirements

For example ARTIS have previously developed new test procedures for aerosol gasket sliding friction, electrical connection push in force and gas permeation.

COMPOUND DEVELOPMENT

ARTIS has access to a historical formulation database with thousands of formulations to meet a variety of industrial and commercial specifications. If these do not meet your exact requirements, compound development can be targeted at meeting existing specifications, optimising an existing formulation or developing a new material for a novel application.

Evaluation of alternative raw materials is becoming increasingly necessary due to withdrawal of raw ingredients for cost or REACH implications.

RHEOLOGY AND PROCESSING

Our processing capabilities can be used to support product developments through optimised process performance improvements, modelling or low volume process trials.

- MDR and Mooney rheology
- Capillary extrusion rheometry
- Bi-Conical rotor rheometer
- Characterising and modelling processing behaviour

ANALYSIS AND CHEMICAL

The analysis laboratory at ARTIS has equipment and techniques to examine the chemical and physical properties of numerous materials and compounds including:

- Complete compound breakdown
- Polymer type
- Filler loading and type
- Additive and curative identification
- Infrared Surface analysis
- Optical and scanning electron imagery

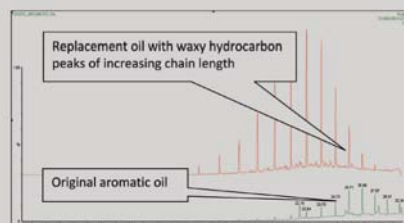
The complete portfolio of rubber and plastics analysis to support a wide range of industry markets and sectors.

GCMS CAPABILITY

ARTIS have expanded their testing capabilities with the purchase of a Perkin Elmer Clarus 560S GC-MS. The GC-MS can be used to analyse a wide variety of materials, and typical applications for the polymer industry include detection of anti-degradants and contaminants. Use is not restricted to the analysis of polymers with other widely used applications including analysis of contaminants in soil and water. The equipment is fitted with headspace analysis to allow identification of volatile components.

CASE STUDY

Due to regulation changes an alternative aromatic oil was required. The replacement oil was identified by analysis as having a higher aromatic content and a slightly grainy texture. Analysis by GC-MS showed an increased level of waxy hydrocarbon for the replacement candidate.



We recommended a monitoring period during initial replacement.

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PRODUCT SUPPORT AND DEVELOPMENT

ARTIS has the experience you and your development team require to provide detailed understanding of the properties, processing and long term performance of your materials. In the early stages we can conduct feasibility studies to assess potential candidate materials. Further into the development process optimisation of a specific material or characterisation of specialised properties may be required. As the product moves to prototype manufacture, process data and flow modelling will help to ensure your product processes well. As the design is finalised you will want to understand the long term behaviour of your material before the production phase begins.

COMPETITOR BENCHMARKING

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- Complete compound breakdown
 - Polymer type
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ARTIS have the complete portfolio of rubber and plastics analysis techniques available to support a wide range of industry markets and sectors.

When this analysis is complete we can then re-engineer a formulation based on this breakdown, mix material on a laboratory scale and give you an equivalent to match the performance.

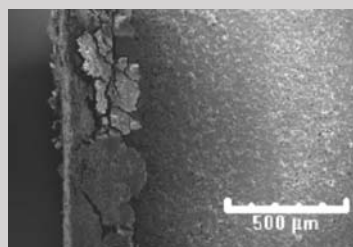
PROBLEM SOLVING AND OPTIMISATION

Determining the exact cause of a component failure is the first step towards defining corrective action. Whether it is incorrect materials selection, chemical and environmental contamination, response to a non design load or a processing error. An understanding of why a material or product has failed requires detailed knowledge of the long term performance of polymers together with a thorough understanding of their interaction with specific service environments (chemical, temperature, stress and time).

Supported by our chemical analysis and mechanical testing laboratories we are able to rapidly assess the cause of product failures and, importantly, recommend remedial action to minimise the risk of further failure. To discuss a specific failure diagnosis please call one of our technical advisors.

CASE STUDY

Analysis of corrosion on aerosol can seals shows evidence of aluminium oxide on the rubber surface. A galvanic corrosion theory was proposed and a test method developed to validate alternative compounds.



CORROSION IMAGE



ALUMINIUM DEPOSITS

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DEFENCE

THE MATERIAL DIFFERENCE



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DEFENCE INDUSTRIES

ARTIS support the Defence Industries through both its experience with Avon Rubber p.l.c. and through its wider knowledge and experience of materials development.

CBRN

ARTIS has extensive experience in materials for CBRN applications - having developed materials for these applications in the past and in offering current support through Avon Rubber to both the UK and US Government Defence Departments.

Consequently ARTIS has very good links to CBRN test facilities and can arrange testing of materials or new technologies to increase CBRN protection against a range of threats.

ENERGY ABSORBING MATERIALS

ARTIS has the ability to develop energy absorbing materials for:

- Ballistic applications
- Noise and IR signature reduction
- Electromagnetic absorption
- Acoustic absorption

ARTIS are particularly keen to partner in these areas to develop new materials and constructions and feel that elastomeric solutions have the potential to offer significant benefits.

TRANSPORT AND ENGINEERING

In land vehicle markets ARTIS have experience in the development of materials for vibration isolation, bushings, and vehicle track. ARTIS have:

- Developed materials for these applications
- Studied the failure modes
- Developed tests and equipment to measure performance

In particular ARTIS has equipment specifically designed to measure the chunking failure of wheel, pad and bush elastomer compounds validated through field trials with the UK MOD.

Monitoring the heat build up during these tests can allow optimisation to reduce the thermal signature of vehicles.



PRODUCTION AND MANUFACTURE OF COMPONENTS

From lab development to small scale prototype production, ARTIS have experience and equipment to deliver functional parts in a range of elastomeric and polymeric materials. For scale up to larger volumes we have industrial links with many companies including Avon Rubber p.l.c. to take your ideas from concept sketch to technical demonstrator and final production.

FORENSICS AND FAILURE

ARTIS has extensive experience in looking at service returns and product failures from many different sources. Using a combination of experimental techniques it is possible to understand:

- How the product / part has failed
- Suggest reasons and corrective actions

Usually this will involve:

- Microscopy
- Compositional analysis
- Surface analysis

It is important to understand the effect of service conditions on compounds and their interactions with the environment. The ARTIS formulating team can offer solutions to solve problems in real world applications.

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FORMULATION DEVELOPMENT

ARTIS have a long history and an extensive library of automotive formulations developed to meet current industrial automotive specifications. Through links with custom compounders and processors we can take requests from the laboratory development phase through to industrial scale up and production approvals. Our expert staff have intimate knowledge in formulating for:

- Coolant hoses
- Fuel hoses
- Tyres
- Glazing seals
- Windscreen wipers
- Vibration isolation

ABRASION AND CHIPPING EVALUATION

For tyre and wear reduction, abrasion and chunking performance is often of critical importance. ARTIS have industrial standard and bespoke equipment which allows us to characterise the abrasion and wear of compounds and correlate these results with fundamental material properties.

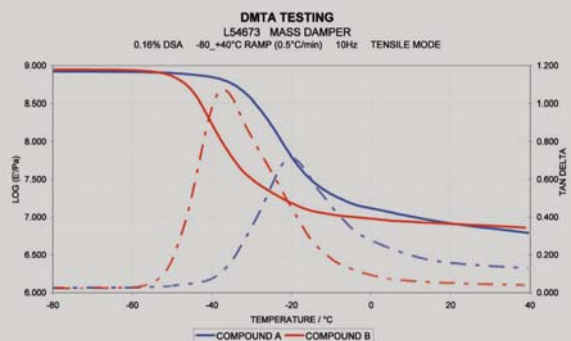
ECD TESTING

Electrochemical degradation (ECD) is a failure mechanism seen in engine coolant hoses whereby an electrical circuit is set up between the engine, coolant hose and coolant liquid. During the 1990's ARTIS worked extensively with suppliers to develop suitable tests to replicate this phenomena and are now recognised as a leading authority on the problem. Whether it is characterisation of the cause of a problem or alternative formulations to prevent an occurrence we are confident we can help.



CASE STUDY

Comparison of two compounds for a mass damper system by dynamic mechanical analysis shows improved low temperature performance for one compound. Further testing using the WLF technique was used to characterise the two materials over several decades of frequency.



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ABOUT ARTIS

ARTIS is a trading brand of Avon Rubber p.l.c. and is recognised as a World leading independent rubber, plastic and composite test laboratory dedicated to material research, material testing, material analysis and product or process development. Artis offers a cost effective development support for a varied selection of industries requiring Polymer specialisation. We focus on end-user industries which include: The polymer recycling industries, automotive, Industrial & consumer, Defence.

OUR STRONGEST ASSET

Our companies core strength lies in the skills and experience of its people, many of whom are recognised and accepted as leading industrial experts in their field. Clients can commission individual services, specialist consultancy or participate in multi-client research projects. Assistance in obtaining funding from the European Community & UK government and/or industry, to progress research and development of polymer technology and applications can be provided.

DEVELOPMENT SERVICES

Our physical test laboratory aims to provide a fundamental understanding of material properties to allow correlation with practical performance metrics such as stress, abrasion, fatigue, impact & their performance in products in particular conditions. Testing is conducted to a range of national and international standards as well as custom testing tailored to an individual company's requirement. Our analytical and chemical laboratory compliment this service offering material identification & characterisation using a range of advanced chromatographic, spectroscopic, thermal and imaging techniques.

COMPANY HISTORY

- 1990 – 2007 Operated as an internal development laboratory for Avon Rubber p.l.c. under the working title "Material Development Centre"
- 2007 – Launched as an independent research and test facility under the brandname ARTIS
- 2009 – ARTIS moved to new facility in Melksham

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