TORAY
Innovation by Chemistry

「先端分析」には新たな
「サイエンス」を切り拓く力がある

INNOVATION IN. EXCELLENCE UP.

株式会社 東レリサーチセンター

ライフサイエンス

「健康長寿社会の実現」に向けた研究開発をサポートします

誰もが生き生きと健康に、より長く活躍できる社会が望まれています。最先端素材、バイオセンサー、通信技術など、あらゆる技術を結集して進められつつある疾患の早期の発見、未病での僅かな変化を検出する為の製品開発に、バイオ分析技術、材料分析技術の両側のアプローチからサポートします。

「よりよい医薬品を1日も早く患者さんに届けたい」を支えます

高い技術力と豊富な実績を活かした分析試験の実施により、安全に確実にスピーディーに、新しい医薬品の上市をサポートします。アンメットメディカルニーズに応える新しいモダリティに必要な分析技術にも、いち早く取り組みます。

Information and Communication

Logic・Memory

Image Sensor

Power IC・MEMS

最先端半導体デバイスの研究開発支援

IoT、5G、クラウドやエッジコンピューティングなど新たなサービスの拡大やニューロコンピュータや量子コンピュータなどの新技術が発展しています。その中で、最先端高性能半導体チップをはじめ、高感度高解像度センサー、低消費電力パワーICなど各種半導体デバイスが求められています。それらデバイスの研究開発を高度な分析解析力にてこれからも支援していきます。

独自性の高い半導体デバイス評価機能

- ●拡散層（空乏層）の評価： DPC（Differential Phase Contrast)-STEM
  ※SCMよりも高空間分解能（数10nm程度）での評価が可能です。
- ●ドーパント分布の評価：Nano-SIMS
  ※Dynamic SIMSと同程度の感度・高空間分解能（＞50nm）での評価が可能です。
- ●結晶粒径・結晶欠陥分布の評価：ACOMーTEM
  ※XRDやSEM-EBSDよりも高空間分解能（数nm程度）での評価が可能です。

モビリティ

センサー・ディスプレイ

蓄電池・燃料電池・太陽電池

構造体・塗料・触媒・燃料

未来のモビリティ社会の実現を支援

次世代のモビリティ・システム Connected（コネクテッド）、Autonomous（自動運転）、Shared & Services（カーシェアリングとサービス）、Electric（電気自動車）の実現に向け、様々なデバイスの技術が構築されています。最新の技術と豊富な経験を駆使し、それらデバイスの開発を支援いたします。

性能・耐久性の向上を支援する独自の *in-situ*（その場）分析

- ●全固体電池の *in-situ* SEM観察
  充放電させながら、断面方向でSEM観察およびSEM-EDXが可能です。
- ●加熱 *in-situ* TEMを用いたアモルファスSi膜の結晶成長過程の可視化
  熱処理中の材料の熱挙動をnmレベルで可視化し、構造変化に関する知見を得て、膜質制御などプロセス開発に役立てることができます。
- ●高分解能X線顕微鏡を用いた非破壊・三次元構造観察
  低密度成分の高コントラスト観察が可能。ポリマー/ポリマー接着接合の評価に有効です。

環境・エネルギー

太陽電池、水素製造触媒

ＣＮＦ、バイオマス、リサイクルプラ

新規化学物質の申請サービス

再生可能エネルギー技術開発支援

地球温暖化防止の切り札として、CO_2を排出しない太陽電池やバイオマス、水素といった新エネルギーが注目されています。GCIB-TOF-SIMSによる有機薄膜太陽電池の光電変換層評価や水素製造触媒、水素脆性等各種評価を行います。

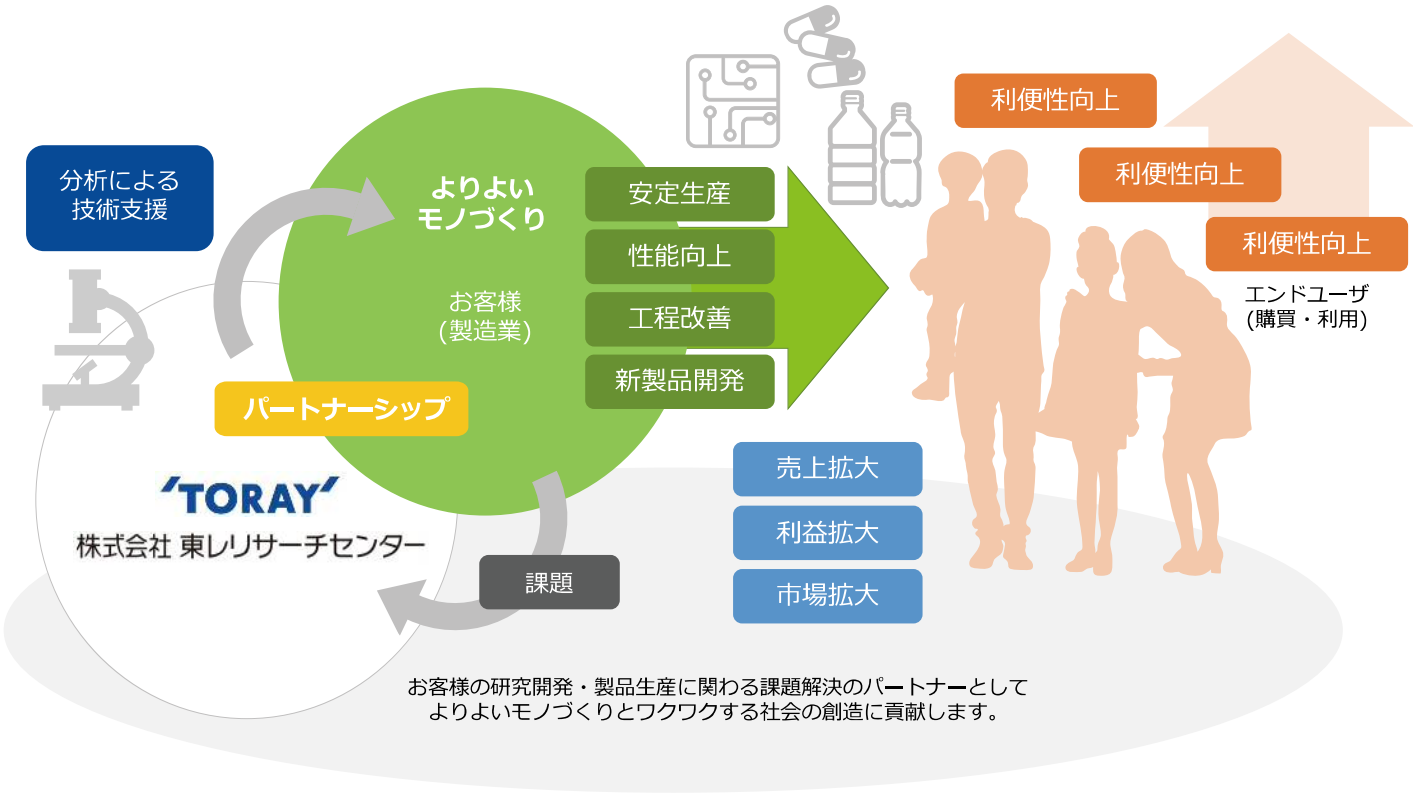
エコマテリアル開発支援 ～各分野で注目の新素材！～

海洋プラスチックゴミが問題となり、近年環境にやさしい生分解性プラスチック、植物由来原料プラスチック、更にはプラスチックのリサイクルが着目されています。
ＣＮＦ繊維一本のTEM観察や、プラスチックの性能に関係する、ＮＭＲによるポリマー構造解析、ラマン分光法を用いた結晶、配向解析を行います。

新規化学物質の申請サービス ～韓国・中国・台湾の法規制に対応！～

新たな化学物質を製造、輸入する場合、化審法や労働安全衛生法といった法律に則って、人や環境への有害性がないことを確認し、登録する必要があります。高分子フロースキーム試験をはじめ申請に必要な各種試験の実施から、申請作業までサポートいたします。
日本のみならず、中国、韓国、台湾等海外登録申請についてもサポートいたします。

ミッション



お客様がエンドユーザーの満足向上・感動を実現するために、
お客様のさまざまな課題を高度な分析を通した技術支援を通して協力して解決していきます。

将来構想

分子一つの精密計算からデバイスの動作検証まで、
マルチスケールシミュレーション＋データ科学 による現象の高精度・高効率解析

分析サービスとして、現実空間における「実験(計測)」を主とした材料の構造や物性の一方向解析だけでなく、
仮想空間における「計算(シミュレーション)」と「データ科学」を融合し、双方向予測を可能とする新サービスを展開します。

会社紹介

東レリサーチセンターとは

東レリサーチセンターは、受託分析・受託調査を通じて、研究開発や生産分野における様々な課題に対して、分析技術や物性解析による技術支援を行っております。発足以来40年にわたり、常に最新で最高性能の設備をそろえ、分析技術を進化させ、研究員の知識や技術の向上に邁進してきました。

会社概要

社名	株式会社　東レリサーチセンター (Toray Research Center, Inc.)
設立	1978年6月1日(昭和53年6月1日)
本社所在地	東京都中央区日本橋本町一丁目1番1号
資本金	2億5千万円（授権資本10億円）
売上高	8,395百万円（2020年3月期）
要員数	395名（2020年3月末現在）
事業内容	受託分析/教育
URL	https://www.toray-research.co.jp/

私たちの強み

1 お客様のご依頼目的に対する正しい理解力

高度な技術で期待以上の結果をお届けするために、私たちはさまざまな観点から研鑽をつづけています。

2 目的に合った最適な分析手法の提案力

ライフサイエンス、 Information and Communication 、モビリティー、環境・エネルギーなどで培ってきた分析技術を基に、課題解決のパートナーとしてご提案します。

3 豊富なノウハウに裏付けされた分析力

常に最高レベルの技術力を追求し、多様な分析依頼に対応する、分析のプロフェッショナル集団です。

4 信頼性の高いデータを用いた深いディスカッション力

お客様の製品開発の問題点を解明し、課題を素早く解決するために、私たちが持つ力を発揮していきます。

お問い合わせ

ご依頼の流れ

受託内容は一切機密扱いとし、すべてをプロジェクト番号で処理するなど、機密保持には細心の注意を払っております。

お問い合わせ先

詳細ディスカッションのステージでは、ご希望・必要性に応じて機密保持契約締結も可能です。まずはお気軽にご相談下さい。

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0120-95-2186

https://www.toray-research.co.jp/

"TORAY"
Innovation by Chemistry

Contributing to society through sophisticated application of technology.

Toray Research Center, Inc.

Leave your analysis and research requirements to us!

Toray Research Center, Inc. (TRC)

Is there something that concerns you at work, or something that you would like to know ?

We are also engaged in training and publishing!

For example ...

Issue

Bubbles in LCD panels.
A trial-and-error approach to eliminating them isn't working…

In such cases,

Customer + TRC

First we analyze the gas composition in the bubble to identify possible sources. Then we combine this with outgas analysis of the materials in the manufacturing process. This yields ideas for process optimization, such as adjusting baking temperature.

Solution

For customers facing technical difficulties or a lack of knowledge.

Manufacturing

Issue

- Yield enhancement
- Defect and damage analysis

TRC support

Physical property measurement, composition analysis, structural analysis, overall analysis, idea sharing

Process development, quality assurance

Issue

- Consistency with design
- Optimization of the process conditions
- Improvement of the level of perfection in quality
- Grasping inherent problems and solving them
- Quality analysis

TRC support

Physical property measurement, composition analysis, structural analysis, overall analysis, idea sharing

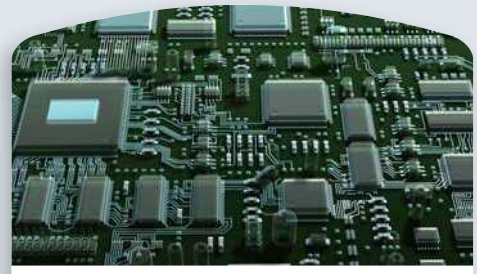
Research and development

Issue

- Selection of materials, creation of new materials
- Analysis of other company products (reverse engineering)
- Mechanism analysis
- Deterioration analysis of components

TRC support

Physical property measurement, composition analysis, structural analysis, overall analysis, idea sharing

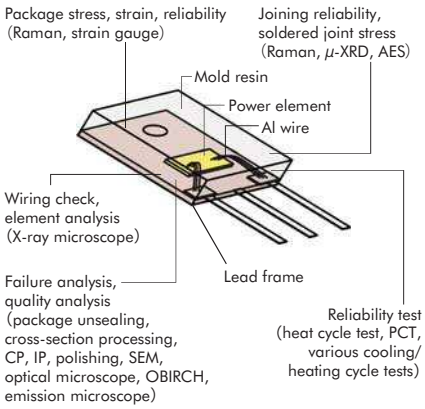


Semiconductor, packaging

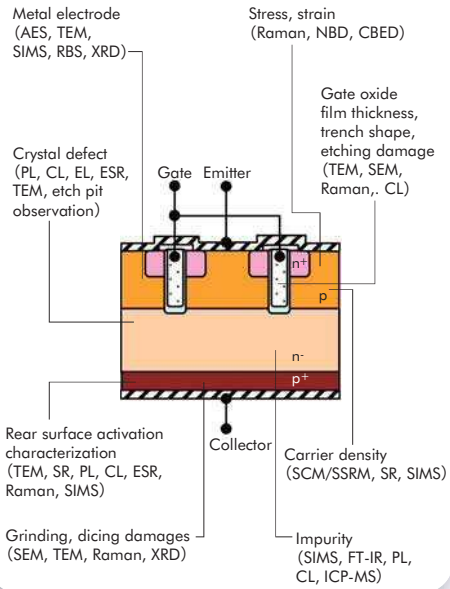
- LSI, IC, memory
- Power devices, discrete devices
- Compound semiconductors, opt devices
- Organic transistors
- Lithography
- MEMS, sensors, TSV
- Packaging
- Clean room air
- Ion implantation
- Electronic, functional materials

Refinement and speeding up of semiconductor devices as well as adoption of new materials has been advancing rapidly and there is increasing demand for reliability. We offer optimal proposals backed by abundant experience and expertise and a wide range of analysis technologies to support semiconductor research, development and production.

Schematic diagram of a discrete package



Schematic diagram of the cross-section of trench IGBT

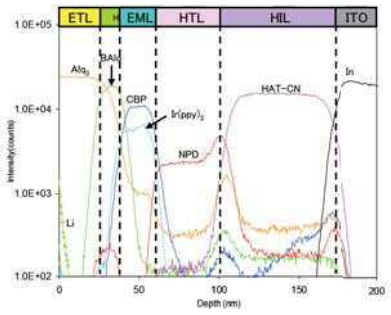


IT equipment

- OLED display
- Liquid crystal display
- Electronic functional materials
- Printers, copiers
- Electronic paper

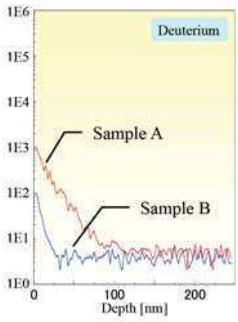
OLED display failure analysis

Organic layer degradation or trace component diffusion often causes decrease in luminance. Using GCIB-TOF-SIMS, we determine which part of the organic layer has been degraded and identify the cause.

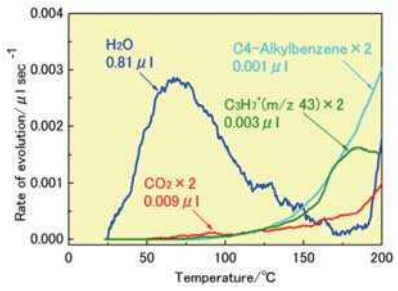


No change was observed in main component distribution caused by drive.

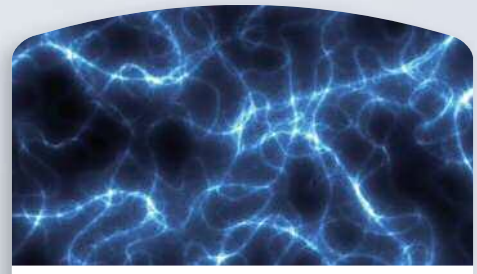
If it is estimated from the analysis that moisture caused the failure, it is necessary to examine whether it is caused by water infiltration from outside or moisture generation inside. We use D-SIMS to estimate the immersion path.



If it is moisture generated within the component, moisture and out-gas component in the material can be analyzed using TPD-MS.



We identify the cause of the failure through these analyses and solve the issue by feeding the result back to the process.



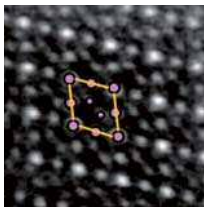
Batteries

- Lithium-ion batteries
- Fuel cells (PEFC, SOFC, etc.)
- Next-generation storage batteries
- Solar cells (silicon, compound, organic thin film, etc.)

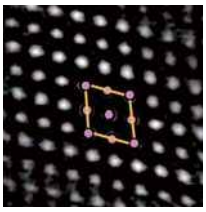
We started focusing on lithium-ion batteries, fuel cells and solar cells from early on, and have been contributing to technology development at our customers through analysis and research as the leader in battery cell analysis. We perform structural analysis, characterizationof the deterioration of actual cells and prototype cells and characterization of peripheral components of module in advanced material development of each type of battery cells as well as assembly analysis of commercial products. In addition, we also perform trial manufacturing of actual cells using components being developed for lithium-ion batteries.

Example of lithium-ion batteries characterization

Atomic image observation of lithium-ion battery cathode active material (degraded part)



Spinel structure
e.g. Co_3O_4

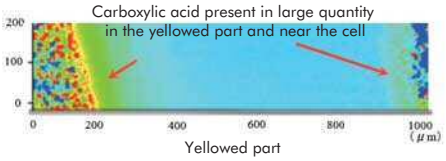


Sodium chloride structure
e.g. CoO

Visualization of atomic arrangement in crystal

Example of solar cell characterization

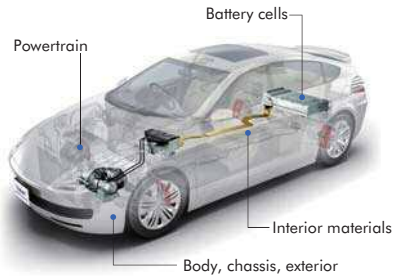
Solar cell module (above) and analysis of sealing material of yellowed part (below)



We perform characterization of time-related deterioration of module.

Automobile

- Lithium-ion batteries
- Fuel cells
- Capacitor
- Power devices, discrete devices
- Compound semiconductor, opt devices
- MEMS, sensor, TSV
- Polymers
- Composites
- Exhaust gas, exhaust gas catalyst



We support promotion of various development themes such as safety improvement, environmental load reduction, durability improvement and comfort improvement sought in automobiles and solve troubles using analysis technologies developed through actual works.

Powertrain

- Reaction mechanism analysis of exhaust gas catalyst
- Composition analysis of exhaust gas and engine oil
- Composition analysis of PM and deposit
- Structural analysis of automobile-use DLC film

Batteries

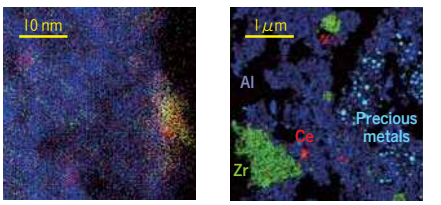
- Composition and deterioration analysis of LiB
- Composition and deterioration analysis of fuel cells

Body, chassis, exterior

- Durability analysis of coating and resin components
- Material adhesion trouble analysis
- CFRP reliability analysis

Interior materials

- Identification of causes of resin and rubber discoloration and deterioration
- Automobile interior VOC measurement



Pristine (dispersed evenly)

After driving 100,000 km (carrier components were separated and precious metals were coagulated)

Example of STEM-EDX observation of carrier components (Ce, Al and Zr) and precious metal distribution in exhaust gas honeycomb catalyst

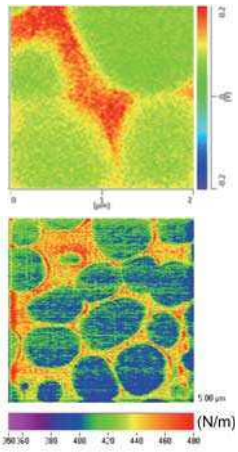
Materials

- Resin, plastic, rubber
- Metals, inorganics, ceramics
- Composites
- Organic materials, chemical products
- Electronic materials
- Nano materials
- Gas analysis
- Exhaust gas, exhaust gas catalyst
- Photocatalyst, catalyst
- Chemical substances control law

- Teamof professional analysts of their techniques
- Technology development in response to customer needs
- We aim to become our customers' partner with analysis that leverages collective strength and team play

We offer solutions by utilizing latest technologies as well as general methods.

Interface analysis with high spatial resolution



AFM-IR
Structural analysis with spatial resolution of about 100 nm, which reveals chemical species distribution and changes in chemical structure around interface.

Nanoindentation
It enables examination of viscoelasticity balance and presence of weak layer that are important for expression of strength and adhesion.

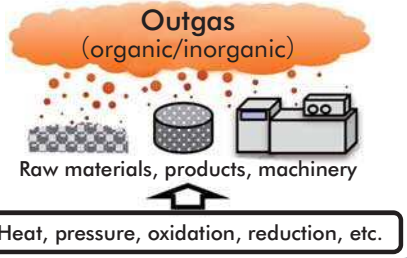
Sample: epoxy/PES* (20 wt%) blend polymer

Analysis for optimizing production process

Industrial machinery failure
corrosion of metal parts

Product malfunction
bubbles, cracks, coloration, dimensional error

Environmental load
odor, scattering of environmental pollutants



Environment

- Combustion product gas
- Indoor air, atmosphere, work environment
- Environmentally controlled substances
- Chemical substance control law
- Overseas application for new chemical substances
  Proxy service system for application for polymeric chemical substances in Korea, China and Taiwan
- Exhaust gas, exhaust gas catalyst
- Photocatalyst, catalyst

Analysis of gas components in work environment

If there is odor, we can collect the gas on site and study its components. We can assist you in your investigation to determine the cause from the information of materials and processes involved. We can also examine whether the gas component is a controlled substance or if it is present in harmful levels.

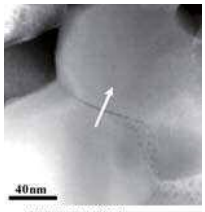
GC/MS measurement

New chemical substance registration application service

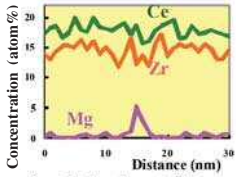
To manufacture or import a new chemical substance, it is necessary to confirm and register that it is not harmful to people and environment in accordance with laws such as Chemical substances control law and Industrial safety and health sct. We support the process starting from the implementation of various tests required for application including polymer flow scheme test to application-related work. In addition to Japan, we support similar registration and application processes overseas such as China, Korea and Taiwan.

Performance evaluation of exhaust gas catalyst

Catalysts are used to detoxify exhaust gas such as NOx and Sox. We not only perform structural analysis of actual catalysts using various methods but also offer suggestions on experiments for performance evaluation such as evaluating the impact of a catalyst while observing the gas concentration and measuring catalytic reactions on site.



STEM-HAADF image



Quantitative elemental line profiles by STEM-EDS

Life innovation

Medical equipment, medical supplies
Inspection equipment, MEMS, bio sensors
Regenerative medicine, culture apparatus, medium, reagents
Polymers
Electronic functional materials

We contribute to the life innovation with our advanced analysis techniques developed through actual works for various industrial fields.

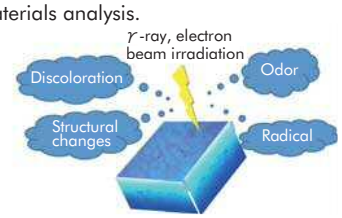
Characterization of medical purpose supplies

We assist in the development of materials for medical applications, which improve the quality of the medicine, treatment and testing, to enable long and healthy life, with wide ranging analysis technologies.

- Basic physical property: mechanical strength, Pore size distribution
- Surface property: wettability, surface treatment result
- Microstructure observation
- Chemical structure: hydration structure, radical
- Composition analysis: polymer structure, additives
- Elution test, biological safety test

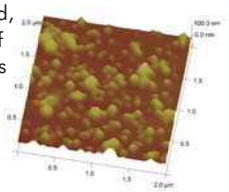
Analysis of the impact of sterilization on material

We analyze the cause from various angles by leveraging our abundant knowhow in materials analysis.



Bio sensor functional evaluation

In addition to materials evaluation and evaluation of electrical signal conversion device parts, skills which we developed in the semiconductor field, we perform analysis of biomaterials of sensors by freely employing surface analysis technologies and bio analysis technologies.



Analysis of reagents for regenerative medicine

There are significant expectations on practical application of regenerative medicine. We make qualitative and quantitative analysis of amino acids, sugar, fat, vitamins, trace metals, growth factors and various proteins to grasp and control composition of reagents such as the medium used in cell culture.

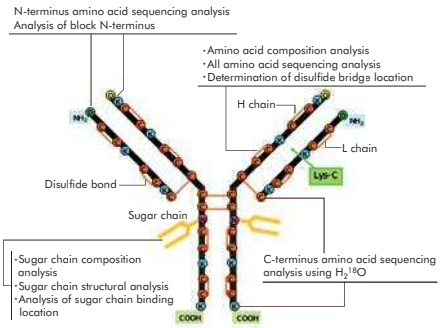
Pharmaceuticals, biotechnology

Low molecular weight medicine
Biomedicine
Food, health food

Pharmaceutical products are used to treat or prevent diseases and are indispensable for people's health. We support your pharmaceutical R&D across various stages so as to deliver more effective and safer medicines to patients.

Drug development

We perform separation and analysis of proteins, peptides, sugar, fat and biologically active substances to support your research for creating pharmaceuticals. Further, we perform structural analysis of biological materials and natural products using element analysis, NMR and mass spectrometry. We also synthesize peptides, which have been gathering attention as pharmaceuticals.



Schematic diagram of antibodies

Pharmacokinetics

In the development of pharmaceuticals, it is important and indispensable to grasp the pharmacokinetics of the drug on people and animals so as to evaluate and assess its effectiveness and safety. The process requires accurate quantification of the concentration of the medicine and metabolites in blood and urine. We offer a wide range of support from development of medicine and metabolite analysis methods to measurement of concentration.

CMC (Chemistry Manufacture Control)

In order for us to use pharmaceuticals with confidence, it is necessary to carry out studies regarding the quality of the product such as assessment of the manufacturing process, the pharmaceutical formulation of the medicine and the setting of quality specification. We support pharmaceutical companies' applications both in Japan and abroad through physicochemical analysis such as stability test under various storage conditions.

Training

We are engaged in the training business, leveraging our abundant experiences of real works.

Analysis courses

Our staff members with field experience offer lectures based on the reality of material analysis to a wide range of customers.

Analysis training

Bearing in mind the actual implementation of analysis, the participants deepen their understanding in an environment similar to actual analysis through a combination of practical and lectures.

Dispatch of lecturers

We dispatch lecturers for analysis-related training programs of individual companies. We also dispatch researchers to actual analysis projects as necessary.

Publications

We publish technical reports that summarize latest technological trends regarding selected themes in a variety of fields such as electronics, materials, environment and energy, fine chemicals, and bio medical. The reports are aimed at assisting not only experts and engineers directly involved with the themes but also those in the peripheral fields and those in other fields thinking of entering the field newly.

Contract research

We propose research projects in response to the various objectives of customers, such as promotion of research and technological development, problem solving and drafting of a new business, collect technological information through studying papers, patent research and interviewing experts, analyze it and report the results. We have research expertise accumulated over the years and a strong track record in scientific technologies in general including materials, chemicals, environment and energy, as well as food and medicine.

Corporate Profile

Company Name ● Toray Research Center, Inc.
Established ● June 1, 1978
Capital ● 250 million yen (authorized capital 1 billion yen)

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●Inquiries (Research Reports)

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http://www.toray-research.co.jp

Usage guide

All details of the contract are treated with confidentiality and we pay utmost attention to confidentiality by taking measures such as processing all information using project numbers instead of specific names.

Inquiries

Please feel free to contact us through our website, the toll-free number or the e-mail address dedicated for inquiries.

Quotation

We will submit a quotation with the method of analysis, research proposal, delivery date and expenses based on your request. Upon placing the order, please confirm the details of the quotation and our terms and conditions.

Placing the order

Once you approve the quotation, please contact our sales staff, who will inform you of the necessary procedures.

Analysis and research

We will perform analysis and research based on your requests. We can also provide interim reports and carry out the analysis and research according to your schedule.

Reporting

Once we complete the analysis and research, we will send you the report immediately. Feel free to contact us regarding any questions, etc. about the results. We can also hold a briefing to discuss the results, on your request.

Payment

As a rule, payment has to be made up front, though payment terms may be negotiated before placing the order.

http://www.toray-research.co.jp E-mail:bunseki@trc.toray.co.jp

This company guidance, using vegetable oil ink on FSC® certified paper, The fountain solution containing an organic solvent has been printed with unnecessary "waterless printing".

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