IT Nanotech Materials

●Growing Stage

(Fiscal Year 2002-2004)

Osaka/Izumi Area

Nanostructure Photonics and Its Application

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Core Research Organizations

Osaka Prefecture University, Osaka University ,
Technology Research Institute of Osaka Prefecture

Major Participating Research Organizations

Industry…SANYO Electric Co., Ltd., OLYMPUS CORPORATION, Konica Minolta Technology Center, Inc. and others
Academia…Osaka Prefecture University, Osaka University
Government…Technology Research Institute of Osaka Prefecture, National Institute of Advanced Industrial Science and Technology (AIST) ,
Osaka Science & Technology Center

Typical result of City Area Program

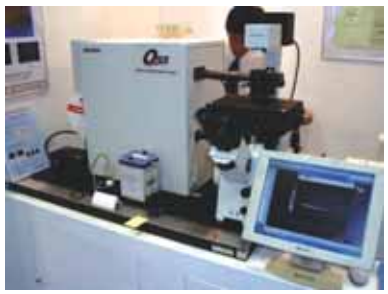
1. Fabrication technology for anti-reflection structured surface is established.

Technology to produce optical parts with low reflection is established using the super precision mold. Optical parts with low reflection rate as low as 1% for the full range of visible light were successfully fabricated by molding optical resin with a die having nano-structure surface. This made it possible to produce high-performance and low-cost optical components without the conventional dielectric multilayer coating. It is expected to improve the image quality by applying the technology to optical lenses for a digital camera etc.

anti-reflection structured surface
(patterned part 50mm x 50mm: SANYO Electric Co., Ltd.)

2. The spectroscopic measurement technology of the ultrafast phenomenon (ultrafast optical spectrogram scope) is established.

To measure a chemical reaction processes in the femto range, ultra high-speed optical communication signal and the reactive process of fragile biomaterials such as cells and protein, a technology of 1) high sensitivity (1fJ or less), 2) single shot, 3) simultaneous imaging in the time and wavelength domain was developed. With this technology, photochemical reaction process using a cyanic organic pigment was successfully measured in the subpico second range. Application of this technology to the microscopes and the optical communication technology will advance the researches of biological and molecular chemistry and the optical communication technologies.



Ultrafast optical spectrogram scope
(Prototype with microscope)

About the approach after the project

1. Spread and development of practical technology for fabricating the anti-reflection structured surface

A technology was established for fabricating a die by micro-machining the metal surface directly, which made electroforming technologies unnecessary. As a result, the curvature accuracy of the lens surface was improved, and the fabrication cost of the metal mold was reduced. On the other hand, new fabricating nanostructures on heat resistant and light resistant glass are investigated in a NEDO project (the next generation optical control material/element technology project) started in FY2006. This technology will contribute to produce optical glass parts used for high quality digital camera, LCD projector and blue laser optical components etc. Moreover, in order to make this technology popular, services are offered such as providing the samples and providing a training of the technologies to the corporations.

A photograph taken with a lens using anti-reflection structured surface
(Provided by Konica Minolta Technology Center, Inc.)

2.Development of ultrafast optical spectrogram scope

In order to apply this technology to devices for measuring various material properties, a project with private company is in progress which selects items suitable for commercialization among technologies developed in the past. Another cooperation with a private company promotes development and patentization standard signals and is applicable to a broad range of applications.