# Introduction to Optical System Design and Manufacturing

# Design process

### Preconceptual design

 Determination of outline structure and main specifications

### Conceptual design

 Determination of detailed specifications based on design studies

# Basic design

•Optical path diagram, assembly drawing, determination of final specifications

# **Detailed** design

 Verify feasibility of product specifications in calculation documents, etc.

### **Fabrication** design

- Documentation of manufacturable level
- Process design for manufacturing

## **Manufacturing process**

### **Material Parts** procurement

- In-house procurement
- provided materials

# processing

- High-precision polishing
- •High strength coating
- •High-precision machining

Assembly

**Tooling design** 

and adjustment

 Precision assembly adjustment by skilled technicians

### **Evaluation of Performances**

 precise evaluation by in-house manufactured evaluation equipment

### **Delivery**

 Quality assurance system based on the ISO9001

We can participate and propose in all stages of the process from planning to realization of products.

### For example:

- feasibility study of pre-conceptual design
- optical design from conceptual design stage to fabrication design stage
- detailed design and fabrication design based on the provided basic design
- making high-precision lenses and machine parts based on the provided drawings

We offer optimal solutions for optical products fabrication, based on our decades of experience in designing and manufacturing UV and DUV optical systems.



**KYOCERA SOC Corporation** 

Inquiry:

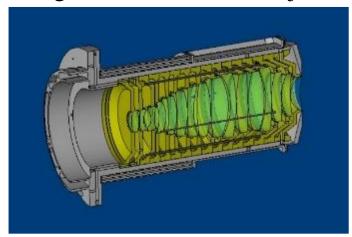
TEL: +81-45-931-6592

URL: https://www.ksoc.co.jp/en/shiryo/ Responsible for sales: Kobayashi and Kimura

Optical components, optical systems, lasers

# Product example

# [High Precision DUV Objective Lens]



<Example of specifications>

- · Wavelength 266nm
- Field of view φ0.4mm
- · NA 0.9
- Transmitted wavefront aberration  $\leq 0.03 \lambda \text{rms}$
- < Applicable range >
  - · Wavelength: 157 nm to near infrared
  - · NA:~0.95
  - Aberration performance: transmission wavefront aberration 0.02λrms
  - Machining accuracy

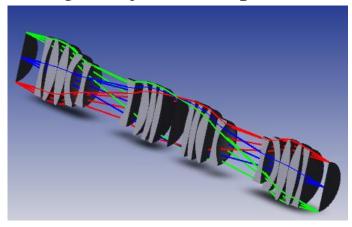
Lens surface accuracy PV  $\lambda/30$  (available for various materials)

Mechanical parts machining accuracy  $\leq 1 \mu m$ 

- Assembly accuracy shift  $\leq 1~\mu m$ 

 $tilt \leq 1$  arcsecond

# [Large Projection Exposure Lens]



<Example of specifications>

- · Wavelength i-line
- Exposure area φ200mm
- Projected magnification 1x NA0. 15
- Transmitted wavefront aberration  $\leq 0.05 \lambda \text{rms}$
- Distortion  $\leq 0.5$ um

#### <Applicable range >

- · Wavelength: g, h, i line
- Resolution: 1.5umL/S
- Exposure area: ~φ360mm
- Magnification 0. 1x (reduced projection) to
  2.0x (enlarged projection)
- Max. overall length 1. 5m
- Lens max. φ410mm, Lens barrel φ650mm
- Supports aberration correction mechanism by lens drive



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