



NEWS RELEASE

June 4, 2015
MITSUI MINING & SMELTING CO., LTD
(MITSUI KINZOKU)

Development of Calcium Fluoride Single Crystals for 8K Ultra High Definition Video Cameras

Nihon Kessho Kogaku Co., Ltd., a wholly owned subsidiary of Mitsui Mining & Smelting Co., Ltd. (President: Sadao Senda), has successfully developed calcium fluoride single crystals for 8K ultra high definition video cameras and commenced shipment of samples.

8K ultra high definition is an ultra fine video format with 33 million pixels. This number of pixels is about 16 times as large as that of the existing high definition format currently used in broadcast. A lens for an 8K ultra high definition video camera needs to have a distortion value that is much lower than those of existing lenses in order to capture images in this very high definition.

Traditionally, it was considered difficult to achieve stable and highly efficient mass production of large calcium fluoride single crystals with ultra low distortion. Recently, Nihon Kessho Kogaku employed its long nurtured technology for steppers based on the Bridgmann Method, one of the methods for creating single crystals, to succeed in creating calcium fluoride single crystals with a diameter of 200 mm and with a distortion value reduced considerably to nearly one-seventh that of conventional single crystals, or, more precisely, to less than 5 nm/cm. This technology generates only minor variations in quality among the calcium fluoride single crystals produced. A technology for mass production has been established.

Under the slogan of *Taking full advantage of Material Intelligence*, the Mitsui Kinzoku Group will continue its intensive endeavors towards the development and stable supply of high quality calcium fluoride single crystals.

(For more details, please contact the following office)
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[References]

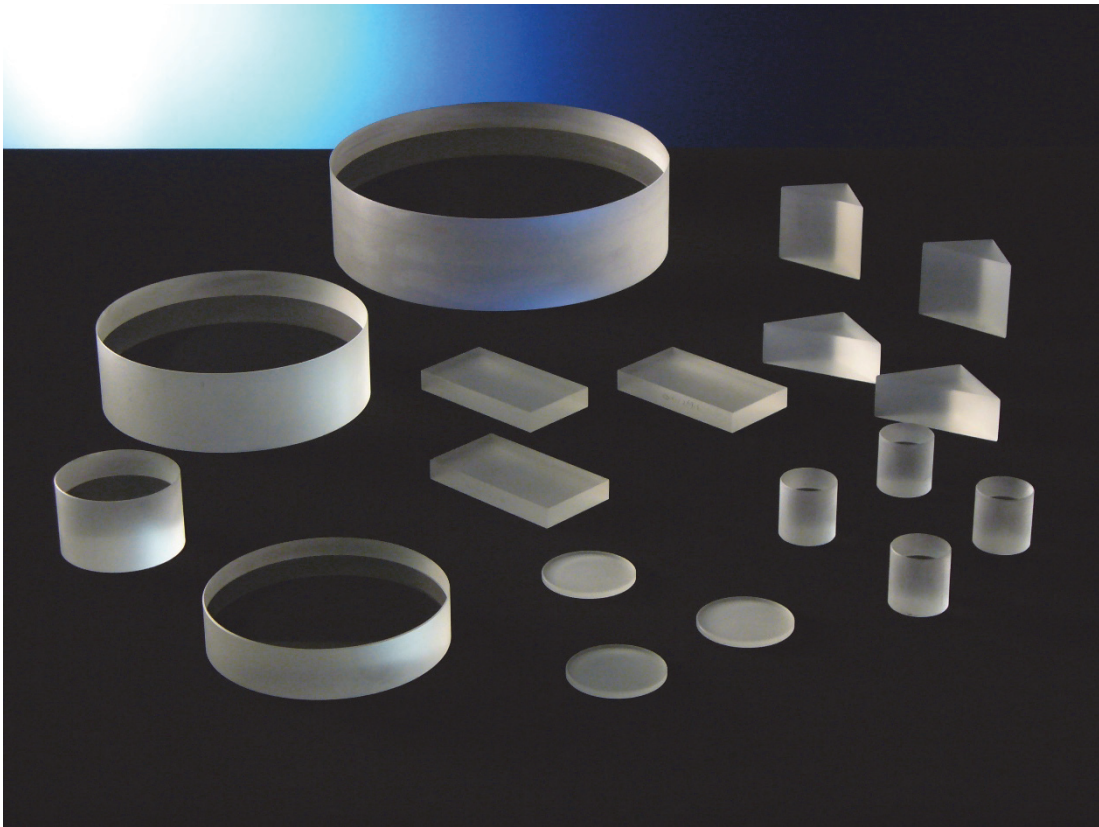


Photo: Calcium Fluoride Single Crystal Products
(The recently developed calcium fluoride single crystal size is the one at the lower left.)

[Glossary]

1. 8K ultra high definition

8K ultra high definition television (8K UHD TV) has an image resolution of 7,680 horizontal pixels by 4,320 vertical pixels. It is 16 times that of current high definition television, with 1,920 horizontal pixels by 1,080 vertical pixels.

2. Stress birefringence (SBR)

The SBR represents a measured difference in the refractive index between the directions of polarization generated from the residual stress inside the lens and is expressed in the form of the optical path difference per centimeter in lens thickness. If a lens with a large SBR is used, blurry images are likely to be obtained.

3. Calcium fluoride

Calcium fluoride is an inorganic compound consisting of calcium and fluorine, chemically expressed as CaF_2 . In nature, it is produced in the form of fluorite, which serves as a raw material for fluorine compounds. High purity calcium fluoride crystals are characterized with limited chromatic aberration and low weight. They are also characterized such that light with a wide range of wavelengths, including ultraviolet rays, visible light and infrared rays, passes through them.

4. Bridgmann Method

The Bridgmann Method is a method of growing single crystals. First, temperature distribution in which the temperature is high in the upper part of the furnace and low in its lower part is created. A crucible containing the material is heated to melt the material. Then, it is slowly pulled down to solidify the molten material in the crucible from the lower part towards the upper part.

[Corporate Profile of Nihon Kessho Kogaku Co., Ltd.]

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| (1) Head Office and Plant | Tatebayashi, Gunma Prefecture |
| (2) Date of Establishment | July 1973 |
| (3) Capital: | 90 million yen |
| Rate of Ownership of Mitsui Mining & Smelting: 100% | |
| (4) President: | Takashi Yamada |
| (5) Number of Employees: | 130 |
| (6) Business: | Manufacturing, processing and sale of optical crystals and detectors for X-ray CT scanners |