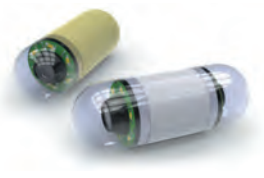
Development and Provision of Image Sensor Materials that Support ICT Society in an Advanced Manner

Social Issues

The performance of image sensors* used to be improved for digital cameras, smartphones, and other equipment for household use. Due to the rapid progress of technologies in the recent ICT society, demand has been growing for more diverse functions and the higher performance of image sensors for applications such as automotive cameras, surveillance cameras, and medical endoscopes. Image sensors are expected to be a solution to diverse social issues related to our lives, including the safety improvement of self-driving systems and the evolution of advanced medical equipment that reduces the burden on patients.

- **Surveillance camera:** The surveillance camera has a night-vision function, with which images shot at night are as bright as those shot in the daytime. Thus, surveillance cameras help ensure the security of the neighborhood, prevent crimes, and enable centralized remote monitoring.
- **Automotive camera:** The automotive camera contributes to high judgment performance of self-driving systems, with a function for shooting images of moving objects accurately and clearly, as well as the night-vision function for detecting pedestrians and obstacles at night or in the darkness.
- **Endoscopic camera (capsule camera):** It is an ultra-small camera that can be swallowed like a tablet. It is used to shoot images of the inner walls of digestive organs with less of a burden on patients.

* Image sensor: The image sensor is a semiconductor chip. Elements that convert light captured by the camera lens into electrical signals are integrated on the chip. It is capable of converting still and moving images into data as the human eye (retina) does.



Value Provision by the Toyo Ink Group

Supporting image sensing with materials

To secure the safety of a self-driving system, the automotive camera as a visual device must include performance that enables the accurate detection of distant road signs and road conditions in darkness or rough weather, in addition to a high level of light resistance and heat resistance. This requires image sensing using an image sensor that is capable of visualizing lights of wavelengths, which are invisible to the naked eye, such as those in the infrared range and ultraviolet range, as well as those in the visible range. Toyo Visual Solutions Co., Ltd. suggests color resist, whose wavelength control range has been expanded to the invisible light range. This color resist realizes those image sensors that make invisible things visible.

In addition to the above, we provide solutions to the shortcomings of cameras that use wide-angle lenses to enable wide shooting range or high recognition performance—distortion of vision and generation of noise caused by heat. For example, we have developed and suggested pigments with high heat resistance, which cut off infrared light. With these and other activities, we support the performance improvement of image sensing in an ICT society from the aspect of materials, thereby contributing to safety and security in a variety of daily settings.

VOICE **Contributing to advancing visual technologies in an ICT society with image sensor materials.**

We have been contributing to improving the image quality of cameras and smartphones by developing and supplying image sensor materials. The ongoing development of an ICT society involves the rapid progress of technologies, which has led to a dramatic improvement in the performance of self-driving systems and surveillance cameras. Image sensors play an important role as the foundation of those technologies. We will make further efforts to develop image sensor materials to help build a sustainable society.

TOYO VISUAL SOLUTIONS CO., LTD.