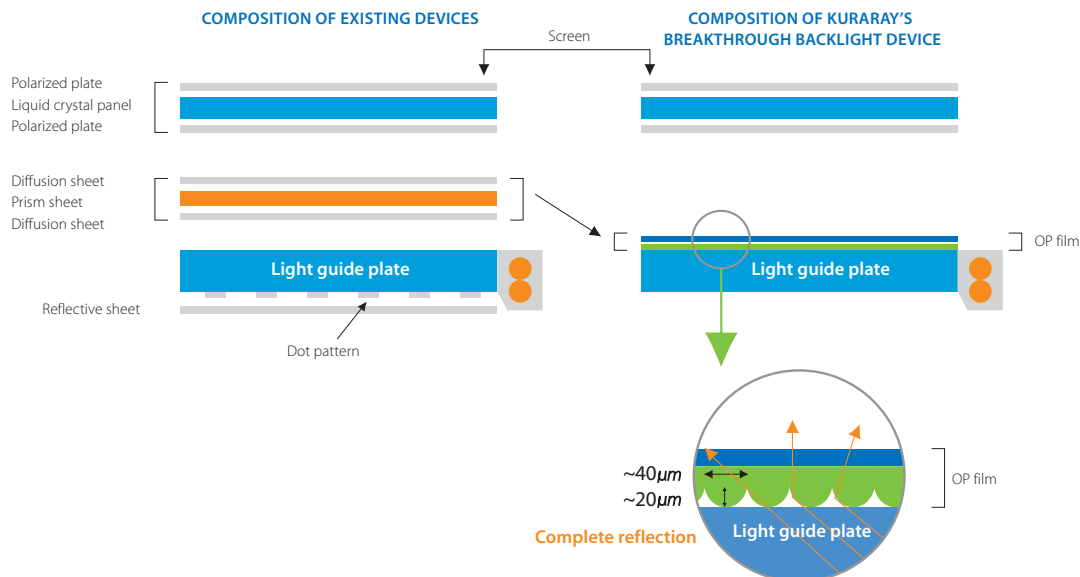


## THE DEVELOPMENT OF BACKLIGHTS THROUGH INNOVATIVE TECHNOLOGY

Backlights and color filters are among the highest-cost LCD components. Despite demand for slimmer, lighter, lower-cost backlights, the development of these components lags behind other LCD components. Leveraging technology cultivated in the manufacturing of light guide plates, Kuraray has successfully developed a breakthrough backlight device, which satisfies that demand. This device combines multiple functions in a single thin layer through the bonding of a special OP film with diffusion and prism functions to a light guide plate. Reducing the number of layers enables slimmer backlight devices, more reliable quality, reduced costs for components and assembly, and enhanced yield. Furthermore, according to our research, OP film has a microlens architecture that enhances light utilization by about 20% compared with existing products. Within the Technology Research Association for Advanced Display Materials, TRADIM, which is led by Japan's Ministry of Economy, Trade and Industry, Kuraray is in charge of backlight development. The application of our breakthrough backlight technology (combined multiple function light guide plate) has allowed us to reduce the thickness of backlight devices to 0.36mm, compared with thicknesses of between 1.0mm and 1.5mm for existing devices. This new technology will enable the creation of much slimmer LCDs as well as smaller and lighter portable devices.

### Slimmer backlight devices

We are enabling slimmer backlight devices through the use of a single layer that performs the functions previously carried out by a four-layer structure.



Properties of Ultra-Bright Inorganic EL

	Brightness (cd/m <sup>2</sup> )	Lifetime (hours)
<b>Ultra-bright inorganic EL</b>	350,000	25,000 or more
Inorganic EL	100	30,000
Organic EL (low-molecular type)	1,000	10,000

- Emits light at low voltage (5~6V)  
→ Can operate using batteries
- Ultra-bright with no heat generation  
→ Long lifetime
- Coating method enables production of large-surface-area light sources  
→ Low-cost production
- Very stable and safe with respect to air humidity  
→ Easy to handle and manufacture

**JOINT DEVELOPMENT OF ULTRA-BRIGHT INORGANIC EL MATERIAL**

In addition to realizing thinner backlight devices, devising a thinner light source is crucial to developing slimmer LCDs. Among current light sources, light-emitting diodes are at a disadvantage as they are point illuminants and thus not suited to large-screen displays. In addition, there are limits to the slimness that can be achieved using cold cathode-ray tubes (CRT). By comparison, EL materials are attracting attention as a next-generation light source because they can be made ultrathin and are surface rather than point illuminants. Organic and inorganic EL materials are under development. Inorganic EL materials have long life spans but inadequate brightness. Organic EL materials have high brightness but short life spans. It is expected that resolving the trade off problem between durability and brightness would produce a revolutionary light source. Our business partner T. Chatani & Co., Ltd. overcame this problem and developed an ultra-bright long-lasting inorganic EL material. Kuraray and T. Chatani & Co. then established the K-C Luminas Co., Ltd. to conduct research targeting the commercialization of material, focusing on the creation of a white light source product for LCD backlight devices. Moreover, we intend to develop a backlight device that combines ultra-bright inorganic EL material with our breakthrough backlight technology. Also, we are setting our view on the development of luminescence materials for full-color displays as well as various light sources.

**OUR CONTRIBUTIONS TO THE FUTURE OF DISPLAYS**

We will allocate management resources to development activities that combine the technology of T. Chatani & Co. for the development of inorganic materials with our polymer, synthetic, and precision molding technologies to create the ultimate ultra-thin, long-life, low-electric-power-consumption display components that can be used with any size of screen. Kuraray will deepen its R&D collaborations with major companies and institutions to accumulate new technologies and contribute to the future of displays.

**CURRENT CAPABILITIES OF VARIOUS TYPES OF DISPLAYS**

		Cathode-ray tube (CRT)	Liquid crystal display (LCD)	Plasma display	Electroluminescence (EL)		
		CRT	LCD	PDP	Inorganic EL	Organic EL	Ultra-bright inorganic EL (under development)
Image quality	Brightness	○	△	△	×	△	◎
	Viewing angle	◎	△	○	◎	◎	◎
	Moving image performance	◎	△	○	◎	◎	◎
Thin-type compatibility		×	○	△	◎	◎	◎
Electric power consumption		×	△	△	○	○	◎
Product lifetime		◎	○	△	◎	△	◎