

FY2008 (30th) Adhesion Society of Japan Technology Award

Development of Pressure Sensitive Adhesive for LCD Optical Films

Date of Award June 26, 2008

Recipients SATAKE Masayuki, OGASAWARA Akiko, TOYAMA Yusuke

Outline of Award The Adhesion Society of Japan Technology Award is awarded to people for original and outstanding work in the development of adhesives and pressure sensitive adhesives, or technology related to such adhesives. It is generally awarded for products that have made a major contribution to the development of mainly pressure sensitive adhesive technology and those that make a contribution to its popularization in society.

▶ Reasons for Award

The use of LCDs has expanded from compact applications, such as mobile phones, digital cameras, and car navigation systems, to laptop and desktop displays and televisions. Optical materials are essential for LCDs to be able to display properly and one of the most important of these is polarizing film. Polarizing film is typically used both on top of and beneath the LCD panel to improve image quality and is normally used in conjunction with various optical compensation films. Generally, these films are stuck together using pressure sensitive adhesive, which is also used to secure these laminated optical films to the glass substrates of the liquid crystal cell.

In addition to developing various optical films during the early 1970s, Nitto Denko has also been engaged in the development and sale of pressure sensitive adhesive for such films. Initially, properties required of pressure sensitive adhesive for optical films were that they be optically even and transparent and

that adhesion failure must not occur due to peeling or bubbling in a variety of environments. Due to the fact that these optical films were not stable dimensionally in environments with high levels of heat and humidity and the LCDs themselves were not capable of having anything strongly adhere to them, research and development efforts were initially focused on the design of pressure sensitive adhesives that would provide high levels of adhesion reliability without any adhesion failure.

In recent years, however, as LCDs have become larger and thinner, there have been demands for new properties, such as improved reworkability and reduced levels of peripheral light leakage.

In the LCD manufacturing process, if an imperfection is detected in polarizing film that has already been applied, then the polarizing film must be able to be easily peeled off without damaging the LCD panel. This is referred to as reworkability. As there is a tradeoff between reworkability and adhesion reliability, it is extremely difficult to simultaneously satisfy both demands. By optimizing the composition of pressure

sensitive adhesive the recipients of this award have made it possible to improve reworkability while at the same time reduce adhesion by approximately 50% as compared with conventional products.

Furthermore, the recipients of this award were able to discover that the cause of the light leakage that sometimes occurs around the periphery of an LCD was the stress generated by dimensional changes in the optical films. They were then able to reduce this light leakage by designing a pressure sensitive adhesive that was able to alleviate the stress.

In this way, we can see that pressure sensitive adhesive is not merely used to stick optical films together, but is an important optical material in its own right that is recognized throughout the LCD manufacturing industry as being able to greatly influence display characteristics.

It is for these reasons that the Adhesion Society of Japan awarded these people the Technology Prize.

It is their desire to continue to develop products that can meet the constantly changing needs of their customers in the future.



In the front row, Mr. Satake is pictured third from left, Ms. Ogasawara sixth from left and Mr. Toyama seventh from left



Medal given for Technology Award