Basel, 5 June 1996

Roche Launches Company To Bring Revolutionary New Liquid Crystal Technologies For Imaging and Displays to Market

ROLIC to Introduce a Series of New Advanced Technologies Developed to Open Vast New Applications in Optics and Liquid Crystal Displays

A recent article in Nature (Vol 381, 16 May 1996, 212-215) reports on linear photopolymerization (LPP) technology

Rolic Ltd., a recently launched liquid crystal R&D company from Roche, has announced the development of several new path-forging technologies which are expected to have a major impact on the liquid crystal display (LCD) and copy proof security industries in the future. Rolic's inventions solve many of the challenges facing the LCD industry, such as view angle dependency, high cost and response time. They represent a quantum leap in making high resolution, large area displays possible. Rolic will make essential contributions to the development of refined, ultra high resolution image and display products. Rolic's future products will enable visual computing professionals as well as the general public to work more effectively with a greater variety of new-age information displays than ever before.

Rolic is a spin-off of Roche Liquid Crystals, leveraging over 25 years of experience as a leader in the liquid crystal device development and chemical business. The researchers of Rolic are internationally leading scientists. Dr. Schadt, CEO of Rolic, together with Dr. Helfrich of Roche's central research unit invented in 1970 the twisted nematic effect on which today's liquid crystal display (LCD) industry is based. Rolic approaches research in a unique way, combining not only device research but also device-specific chemical research which makes electro-optical devices operable, allowing faster development of product prototypes. Many of the patents from this group of scientists form the basis for the rapid development of the liquid crystal display industry around the world. Rolic's scientists have done extensive research in applications related to current and future electro-optical technology and have achieved more than 70 basic patent series as the basis for new products to be brought to the market. These patents cover both new devices and the necessary chemicals to make the devices commercially available.

Rolic is now embarking on an aggressive build-up of new technologies and applications for the next generations of liquid crystal displays and related optical devices. These applications will become available in portable and personal computers, large flat panel television screens, military, aviation, navigational, medical and other display applications.

Technologies

Linearly Photopolymerisable Polymers (LPP)

One of the exciting new Rolic inventions is LPP technology which improves the yield of liquid crystal display manufacturing by replacing the mechanical liquid crystal aligning process used today with optical alignment. The photographic LPP alignment process is faster and less capital intensive than the current mechanical brushing procedure. LPP technology will contribute to reducing the manufacturing costs of all types of liquid crystal displays. Moreover, LPP technology also solves the problem of view angle dependency of present LCDs by creating photograph quality images from every angle. The technology also creates complex copy proof images which are invisible under normal lighting conditions. LPP copy proof images are only readable when viewed through a polarizer. The information content of LPP images is superior to that of present hologram technology. Finally, LPP inventions represent a major breakthrough in rendering economical stereo and three dimensional LCDs feasible with applications in numerous professional fields from molecular modelling to aerospace and defense.

Deformed Helix Ferroelectric (DHF) LCDs: Fast Responding Displays Similar to Prints

The DHF liquid crystal display patented by Rolic solves two major problems of the current liquid crystal display industry: limited field of view and sluggish response times at low temperature which restrict video LCD applications. These current LCD technical limitations are especially apparent in flat panel televisions and outdoor applications such as navigation systems. Rolic's DHF displays generate angular independent images similar to prints plus response times that are about one hundred times faster than the current thin film transistor (TFT) TN LCD technology. Full color images can be displayed with DHF LCDs making high definition flat panel large area television possible when combined with plasma addressing. Leading electronics companies in collaboration with

Rolic have demonstrated the video compatibility of DHF-LCDs. Rolic has recently solved the technical challenge related to the very narrow cell gap of DHF LCDs, now making the technology compatible with the current cell gaps used for TFT LCDs.

With increasing trends towards large, flat panel technologies, Rolic's ability through DHF to combine plasma and liquid crystal technology in complementary ways will have a significant impact on future high definition large flat panel displays. Rolic's DHF technology will make it possible to bring economical flat panel, large screen high definition television more rapidly to the market.

Novel LCD Video Projectors with Compact Cholesteric Liquid Crystal Optics

Another major breakthrough is Rolic's development of cholesteric LCD projector technology which will revolutionize the projection industry with small, light weight devices that are capable of projecting bright color video images onto large screens. Current LCD video projectors are rather dim, require powerful lamps and are bulky. Rolic's patented cholesteric LCD projection technology uses stacked, non-light absorbing color filters with integrated LCD light modulators in single beam configuration. This structure allows the projectors to be highly compact, have reduced energy consumption and increased brightness and image quality.

Integrated Non-Linear Optics (NLO): The Fast Lane on the Information Highway

Rolic's NLO devices will contribute to the developing information "super highway" through integrating optical elements, such as waveguides and modulations, neatly with solid state lasers and driving electronics.

Market Approach

Rolic's unique interdisciplinary research and development team consists of physicists, organic chemists and engineers with the mission of inventing and developing new liquid crystal devices and device-specific chemicals and bringing these new inventions to the market as products. With the strong response in the marketplace to its technologies, Rolic will at first enter into strategic relationships with leading international high technology companies to introduce Rolic's technologies into display, projection and copy proof security products. Rolic has contacted a number of the world's leading firms and is in various stages of discussions leading to co-operations. The developments of these partnerships are expected to meet the growing demand for flat panel display, portable and personal computer, navigational system, LCD projector, high definition work station, television and copy proof security products.

In a second stage, Rolic will produce specific copy proof security products, projection components and projection products.

Executive Profiles

Roche formed Rolic by assembling a team of 30 of its scientists, physicists and engineers from its liquid crystal research groups and appointing Dr. Martin Schadt as its Chief Executive Officer.

Dr. Schadt has an internationally recognized career of over 25 years in the field of liquid crystals and display technologies. As a physicist he combines the rare talent of a researcher with the ability of integrating scientific disciplines to develop patent-based liquid crystal chemicals as well as liquid crystal devices. Dr. Schadt received his PhD in solid state physics at the University of Basel, Switzerland, in 1967. During a two-year postdoctoral fellowship at the National Research Council in Ottawa, Canada, he was undertaking research on organic semiconductors when he discovered the first solid state blue light-emitting organic diode. In 1970 Dr. Schadt joined Roche in Basel as a scientist in the Central Research Department. He is a Fellow of the American Society for Information Display (SID), recipient of the Karl Ferdinand Braun Prize, the Aachener und Muenchener Preis für Technik und angewandte Naturwissenschaften and the Robert-Wichard-Pohl Prize of the German Physical Society.

Dr. Richard Buchecker is the head of chemistry at Rolic. He received his PhD in organic Chemistry at the University of Zurich, Switzerland, in 1972. Dr. Buchecker spent two years at the Norwegian Institute of Technology in Trondheim, Norway, in a postdoctoral fellowship. From 1975 he worked as project head at the Institute of Organic Chemistry at the University of Zurich. In 1984 Dr. Buchecker joined Roche in Basel and became head of the liquid crystal chemical research group. Since his arrival at Roche, he has discovered numerous new structural classes of liquid crystal materials for almost all important LCD applications.

Location

Rolic is located at Grenzacherstrasse 124, 4002 Basel, Switzerland.

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