

Recent Progress in Photo-alignment Technology for Liquid Crystal Displays and Beyond

Kohei Goto
Nissan Chemical Corporation
Email: gotouk@nissanchem.co.jp

Since the first report on photoalignment by Ichimura et al. in 1988, photoalignment of liquid crystals (LC) has been extensively investigated as a key technology for achieving high-resolution and high-contrast liquid crystal displays (LCDs). In particular, owing to its superior viewing-angle characteristics and color reproducibility, photoaligned fringe-field switching (FFS) LCDs have been widely adopted in IT devices such as tablets, notebook PCs, and monitors. Various photo-reactive polymers, including azobenzene- and cinnamoyl-based systems, have been explored as photoalignment materials. From a practical perspective for LC alignment layers, we have focused on polyimides containing photo-decomposable units. Through precise molecular design, we successfully addressed key challenges in photoalignment for FFS-LCDs, namely, achieving both high alignment sensitivity and improved image sticking resistance associated with strong anchoring energy. This achievement led to the first commercial implementation of this technology in the 2010s. To further broaden the scope of photoalignment, we have developed a series of photo-alignment materials for emerging applications offering low-temperature processability and precise control of complex LC alignment. In this presentation, we will present the key features of our photoalignment materials and recent progress in their development.

Biography:



Kohei Goto is a polymer chemist specializing in molecular alignment and functional materials for display applications. He joined Nissan Chemical Industries, Ltd., Japan, in 2002 where he developed alignment technologies for LCs. In 2014, he obtained his PhD degree from University of Hyogo for his research on photo-sensitive polymer liquid crystals. Since 2024, he has been serving as General Manager of Display Materials Research Department of Nissan Chemical.