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Functional Colorants for Optical Data Storage

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He is currently guiding 7 doctoral and 4 masters' students. He has filed 6 US patents. He has published over 20 research publications of international and national repute and presented over 10 papers in national and international conferences.

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ABSTRACT

Recently organic dyes have attracted considerable attention in the diode-laser optical storage. Commercial recordable compact discs (CD-R) and recordable digital versatile discs (DVD-R) can contain, as recording layer, numerous dyes based on phthalocyanine, hemicyanine, cyanines, metallised azo dyes, etc. These dyes are suitable in their respective fields with the laser wavelength criteria. The general requirement of dyes are strong absorption, high reflectance, high recording sensitivity, low thermal conductivity, light and thermal stability, durability for storage and non-toxicity. For industrial application, these dyes have to be suitable for spin coating process to prepare thin films; ie they have to be soluble in organic solvents generally applied for spin coating process.

The Blue laser discs are going to be the next milestone in optical recording technology. Its new specification has increased the data storage upto 27 GB per recording layer for 12cm diameter disc. By adopting blue diode laser with a wavelength of 405 nm, the pit size and track interval can be reduced, increasing the storage capacity.

Dyestuff chemistry has gained the reputation of having become a mature field of activity with various functional application of colorants. When applications in optical data storage are considered, it is evident that even today progresses such as CD-R, DVD/R, blue ray disc and holographic storage would not be feasible without functional dyes.

This lecture gives mainly an overview of the systems used and the properties of the organic dyes that are used in optical data storage systems.