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ABSTRACT

Session 4: Paper 2

CHALLENGES IN FUNCTIONAL COLORANTS SYNTHESIS

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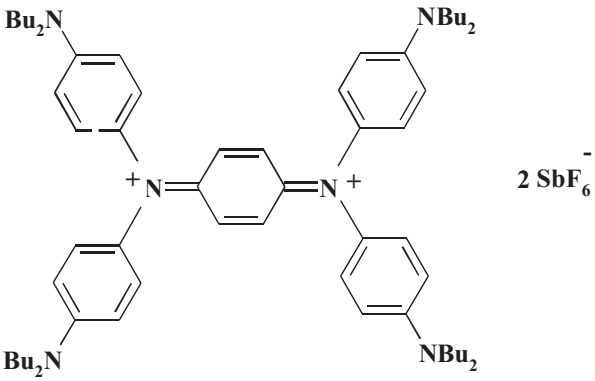
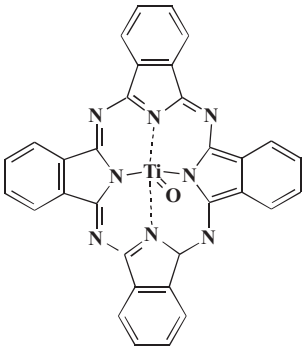
The traditional use of organic colorants is to impart color to substrates such as textiles, paper and leather. However, in the last decade, there have been exciting developments in organic color chemistry as a result of the opportunities presented by the emergence of a range of novel applications which place significantly different demands on colorants. These colorants have commonly been termed functional, because the applications in question often require the colorants to perform certain functions beyond the simple provision of color (Fig 1). The last few years has witnessed a phenomenal rise in the growth of functional dyes for high technology applications, which include a wide range of electronic applications, including liquid crystal displays, microfilters, solar energy conversion, lasers and optical data storage, some of the more recently developed reprographic techniques, such as electrophotography and ink jet printing and a range of biomedical uses.

The presentation describes the challenges in the synthesis of functional colorants, organic dyes and pigments. The high purity of functional colorants (devoid of any impurities) is very important in terms of application properties. This can be achieved by the use of highly advanced purification techniques such as vacuum sublimation, freeze drying, flash chromatography etc. The standardization of synthesis of each intermediate stage is also important with their high purities. This will be carried out with the help of sophisticated analytical techniques such as atomic absorption spectroscopy, atomic force microscopy, nuclear magnetic resonance spectroscopy, differential thermal analysis etc. Selected examples will serve to substantiate and highlight these techniques.



Diimminium dyes

Fig 1: Some examples of functional colorants



Titanium phthalocyanine

Prof. Dr. Vinod R. Kanetkar is Professor of Dyestuff Technology and Head, Dyestuff Department of Mumbai University Institute of Chemical Technology, Mumbai. He is a Member of Board of Governors of Mumbai University Institute of Chemical Technology. He has over 30 years of teaching experience with specialisation in technology and chemistry of intermediates and dyestuffs, perfumery technology, medicinal plant extracts and herbal sciences.

He has successfully guided 25 post-graduate students leading to masters and doctoral degrees. He has published over 35 research publications of international and national repute and presented 30 papers in national and international conferences and conventions.

He had worked as United Nations Industrial Development Organisation (UNIDO) expert for successful commission of pilot plant for manufacturing of dyes and pigments in Vietnam. He is also active in industrial consultations to Indian and Foreign Industries and he has successfully completed 90 industrial assignments.

Presently he is also the Chairman of COC 2007.