

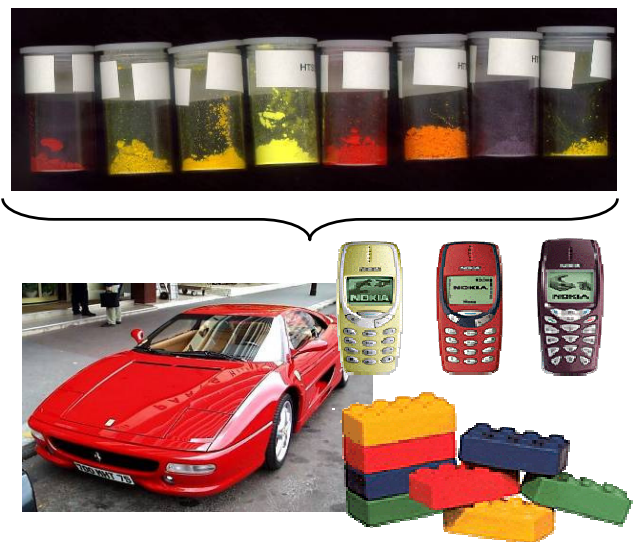
Accelerating the Process from Discovery to Commercial Output: New Pigment Discovery at Ciba SC

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General

Azo pigments, as coloring agents, have penetrated virtually every area of modern life. Automotive coatings and coloration of plastic materials are only two ubiquitous and extremely visible examples of Azo pigment applications.

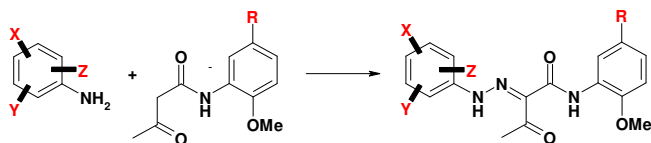


Picture 1: application examples for azo pigments

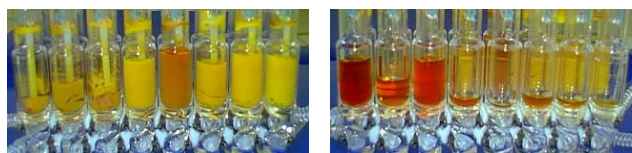
Objective

Synthesize a library of new Azo pigments and identify those candidates, by using a High Throughput Experimentation approach, for commercialization via fulfillment of the following criteria:

- clean shade
- high light stability
- high weather fastness
- low migration and solvent leaching



Picture 2: Synthesis scheme for Azo pigment preparation

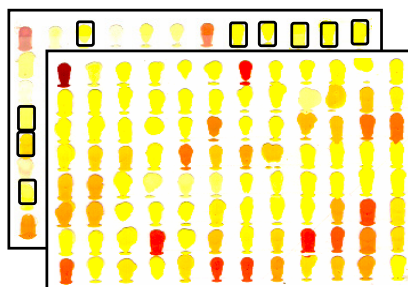


Picture 3: Preparation of Azo pigments on Chemspeed synthesizer.

Reliable, parallel filtration of the crude pigments is a crucial requirement in this workflow.

Results

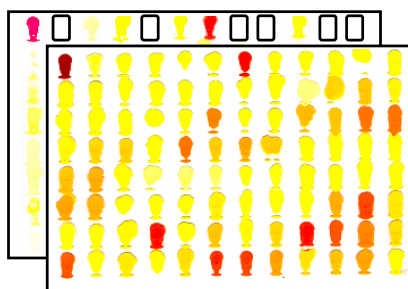
The pigments are dispersed in paint applications and spotted using a micro titer plate like format. The plates are subsequently exposed to UV light and water mist for 250, 500 and 1000 hours. The fading of the spots is assessed visually by superimposing the paint spots.



Picture 4:

Results of the light and weather stability screening: The spots that did not fade after extended light and weather exposure are highlighted with a frame.

Another screening test assesses the migration and leaching properties of the paint formulation, after they are spotted on paper in a micro titer plate like format. Only candidates that do not stain the lower paper sheet are taken into further consideration.



Picture 5:

Results of the migration and solvent leaching screening: Spots that do not migrate to the lower sheet after solvent wetting are highlighted with a frame.

Summary and Conclusion

In a High Throughput Experimentation program, performed on Chemspeed instrumentation, more than:

- 2500 Azo pigments have been synthesized and screened.
- 50 lead candidates have been re-synthesized by traditional means for further investigations.
- 2 new pigments are being commercialized.

This example offers impressive support for the approach of systematically synthesizing and screening defined libraries, in new materials discovery. By parallel, automated synthesis large amounts of experiments can be handled easily and rapidly.