

Nano-pigments and Applications 奈米顏料 / 粉體開發技術

This research effort is directed at the development of nano-pigment platform technologies for high quality printing. Key issues are the selection of pigments/powder, interfacial characterization and analysis, grinding media selection and treatment, as well as methods and equipment for high-efficiency dispersion and scale-up. ITRI has developed cost-effective processes for various pigments with diameter less than 50 nm. Besides superior conventional applications, these pigments are instrumental in the new low-cost ink-jet process developed by ITRI for the production of color filters in display devices.

針對高畫質的奈米顏料開發平台化技術，建立粉體奈米化分散所需之重要關鍵研發能量，如顏料/粉體選用及界面特性與分析技術、高效分散與高安定性的分散劑篩選及設計技術、分散設備、研磨介質選用與處理、製程操作、分散液特性評估及放大設備設置及製程評估等關鍵技術。工研院已開發出符合成本效益、粒徑小於50奈米的多種顏料製程，且將這些奈米顏料應用於本院為顯示器彩色濾光片開發的新型低成本的噴墨製程中。

Technical Specifications

- pigment dispersion size <50 nm
- nano-inorganic powder de-aggregated to the size five to eight times that of primary particle
- powder content >10 wt%

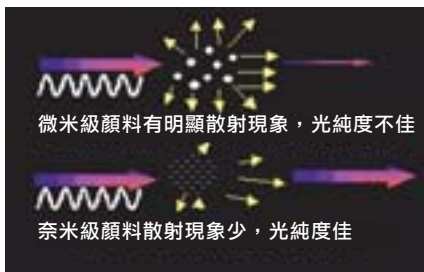
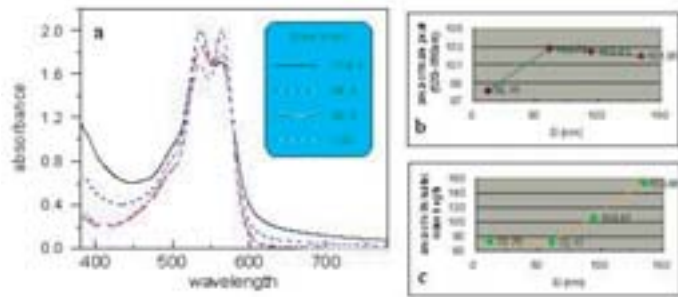
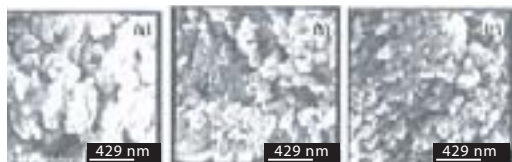


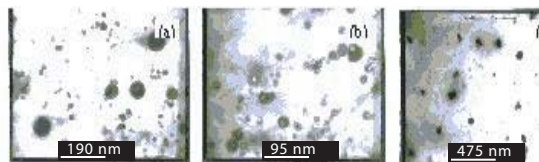
illustration for nano-pigment light scattering and transmission



The relationship between particles size of PR 122 (magenta) and spectral (a: absorbance spectral of different particle size; b: area of main peak; c: area of eliminated wavelength)



Unmilled pigment (a) Yellow 74, (b) Red 122, (c) Cyan 15:3 (SEM)



After microbeads mills (a) Yellow 74, (b) Red 122, (c) Cyan 15:3 (TEM)

Applications

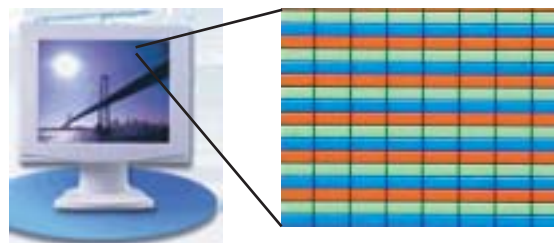
- Imaging or color industry: ink jet printers, LCD photoresist, textile jet printing ink, color paste, pen and painting color paste
- Specialty powder for nano dispersion products: IR, antiseptic, deodorizing, self-cleaning and high abrasion resistant applications.



dilute different size pigment dispersion (a. nanosized, b. submicron, c. unmillied)



Desktop, SOHO, wide format Ink jet printing application
High chroma and color resolution



Color filter application by ink jet printing
High transparency: R>90%, G>80%, B>75%