MCA® DPP Pigments Technology

MCA Technologies GmbH (Switzerland), June, 2008

Supporting R&D & Business Development in Life Sciences and Specialty Chemicals Industries
Our humble contribution towards environmental protection & safety in production
Broad Applicability

Current status

- Electronics: Colour filters for flat screens (nano particles)
- High performance printing inks: Digital printing (nano particles)
- Plastics: High value-in-use (transparent/easy dispersible)
- High-performance industrial paints: Tinting systems
- Automotive: Opaque

Outlook: Extend technology to other pigments, precursors & fine chemicals
MCA® DPP pigments technology is more cost effective and ecological than current state-of-the-art technology of Ciba (and as imitated now by Clariant, and numerous companies in India and China).

Claims based on patents granted or to be granted to MCA Technology in all global key markets: EU (granted), China (granted), India (granted), USA (soon to be granted), Japan (pending), Korea (pending).
Key Benefits

- Lower variable costs
  - Less energy demand
  - Less chemicals demand

- Lower net working capital and fixed asset requirement
  - Lower capacity requirement (higher productivity)
  - No storage and recycling of solvents
  - Less waste

- Less safety risk
  - Less storage and handling of highly inflammable solvents

- Superior end-product quality
  - Nano-particles formed thanks to the absence of solvent

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## Lower Variable & Fixed Costs

<table>
<thead>
<tr>
<th></th>
<th>State-of-the-Art Technology</th>
<th>MCA® DPP Pigments Technology</th>
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</thead>
<tbody>
<tr>
<td><strong>Synthesis</strong></td>
<td>3 Reactants + 5 Solvent = 8 units</td>
<td>3 Reactants + 0 Solvent = 3 units</td>
</tr>
<tr>
<td><strong>Solvent recycling</strong></td>
<td>5 Solvent x 1.5 (fractionation) = 7.5 units</td>
<td>0 Solvent = 0 units</td>
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</tbody>
</table>

- Energy demand ratio: almost 5:1!
- Chemicals demand ratio: Almost 2.7:1!
- Reactor capacity requirement ratio: almost 2.7:1!
- No need for solvent recycling!
Solvent-Free Technology: Superior Economics and Ecologics

- No storage and tedious fractionation of the solvent required for synthesis => lower invested capital required and faster turn-over
- Less waste and no solvent losses => lower production costs and lower investment in waste management infrastructure
- Less storage and handling of highly inflammable solvents => lower safety risk and precaution & logistics costs
Superior Product Quality Supports Broad Applicability

- Nano-particles formed thanks to the absence of solvent in the hydrolysis of the isolated sodium salts (product claim of the MCAT patent)
- Specific & controlled particle size distribution for diverse applications
- Narrow particle size distribution allowing for easy dispersibility and better coloristic properties
- Easy “additivation” if and when required, for specific applications

=> Broad applicability also in high-value added industries with specific requirements
Example: DPP Pigments in Electronics

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Pilot Plant in Korea
DPP 2030: Readily Meeting Specifications of Current State-of-the-Art

Standard DPP Red 2030
(Masstone)
DL: 0.43
DC: 0.47
DE: 0.68

MCA® DPP Red 2030
DL: 0.46
DC: -0.60
DE: 0.8

Standard DPP Red 2030
(White Reduction)

MCA® DPP Red 2030
Red BO: Readily Meeting Specifications of Current State-of-the-Art

Standard DPP Red BO | MCA® DPP Red BO
(Masstone)
DL: 0.41
DC: 1.11
DE: 1.31

Standard DPP Red BO | MCA® DPP Red BO
(White Reduction)
DL: -1.01
DC: 2.16
DE: 2.39

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Maintaining Cost & Quality Leadership: Continuous Process Development

HPLC V5 1F 13.08.03

HPLC Sample-3 03.10.03

HPLC Sample-3 11.12.03

HPLC Expt.2 Sample-3/ 14.04.04

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Highly Reproducible

Experiments   Standard

1   2
3   4
5

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MCA Technologies GmbH (Switzerland)

Supporting R&D and Business Development Chain in Life Sciences & Specialty Chemicals Industries

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