8.2 PAINTS AND COATINGS

8.2.1 Market assessment

Table 15. Market and applications for nanoparticle TiO2 in coatings.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Market age</strong></td>
<td>Nano-Zinc oxide (nano-ZnO) finds application in coatings markets where anti-bacterial, anti-fungal, anti-corrosion, catalytic, and UV-filtering properties are required.</td>
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</tbody>
</table>
| **Application** | • Anti-bacterial agent in the medicine and health and textile sectors, disinfection and self-cleaning glass-ceramic materials, industry sterilization dressings, packaging films and UV-protective textiles.  
• Nano-ZnO dispersions to protect wood, plastic and textiles from solar UV radiation and microbial degradation.  
• Coatings on ceramic filters in water treatment and filtration.  
• Incorporated into automotive coatings for UV-protection and improving the colour finish of automobiles.  
• ZnO nanocrystalline films as functional coatings with corrosion resistance and adhesive properties.  
• ZnO into polymer films for food packaging.                                                                                                                                                                                                                                                                                                                                 |
| **Key benefits and motivation for use** | • Large surface area.  
• Anti-bacterial. Nano-ZnO in coating is effective against a wide range of bacteria including E-coli. ZnO nanoparticles have bactericidal effects on both Gram-positive and Gram-negative bacteria. They even have antibacterial activity against spores that are resistant to high temperature and high pressure.  
• Anti-fungal.  
• High dispersibility.  
• Anti-corrosion.  
• No migration and broad absorption in the UV range.                                                                                                                                                                                                                                                                                                                                 |
| **Market megatrends** | • Increased demand for non-chemical UVA/B filters. As the intensity of UV radiation increases every year, effective methods to block UV rays to protect human skin, plastics, timber and other polymer materials are urgently sought. UV radiation can also cause severe damage in textiles, plastics, paints and timber products in the forms of discoloration, chalking and reduced mechanical properties. Therefore, the development of effective UV-shielding materials is of great importance to our health, society and environment.  
• Trend towards environmental sustainability in paints and coatings. Driven by these regulatory demands, the wood coatings market is moving from solvent borne coatings to solvent-free and solvent-reduced materials. Favoured coatings include waterborne coatings, high-solids, radcure coatings, powder coatings and nanoparticle coatings.  

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