

**Research Institute:**

PTS Heidenau  
Pirnaer Str. 37  
01809 Heidenau

**Head of the research institute:**

Dr. Frank Miletzky

**Project leader:**

Dr. Burkhard Schmidt-Brücken

Tel: 03529 / 551-682

Fax: 03529 / 551-889

E-Mail: burkhard.schmidt-bruecken@ptspaper.de

Internet: [www.ptspaper.de](http://www.ptspaper.de)

**Research area: Product aims**

Paper, paperboard and board // Technical speciality papers

**Key words:**

Photo catalysis, titanium dioxide, paper coating, air and water purification

**TITLE:****Photo catalytic active paper coatings****Background/Problem area**

Contaminated potable water and air pollution are two main risks for human health. This problem concerns not only developing and newly industrialising nations but also developed nations. Caused by the further increasing world population this situation will get worse. In addition, the critical values for many harmful substances are expected to be reduced in the next years. Therefore it is imperatively necessary to develop effective, low cost and environmentally friendly technologies to purify water and air.

Photo catalysis is a well suited process to degrade organic matter and microorganisms from water or air. Titanium dioxide in its crystallographic form anatase is a well known, widely-used and powerful photo catalyst. As additional advantages titanium dioxide is biologically and chemically inert, non-toxic, resistant to photo corrosion and has a strong oxidation potential. Organic matter will be oxidised to water and carbon dioxide finally.

**Objectives/Research results**

The research project contained two main objectives.

The first objective of the research project was the development of water based coating formulations containing titanium dioxide as a photo catalyst, which can be used to functionalise paper surfaces with photo catalytic activity. To avoid instability of the coating (chalking), coating formulations with reduced content of organic compounds compared with typical paper coating formulations were developed.

The second objective of the research project was to screen possible methods for the detection of photo catalytic activity and to ascertain a suitable detection regime for the coated papers.

**Application/Economic benefits**

Paper products with a photo catalytic active function can be used in individually designed stand alone units or filter systems to decrease contamination of potable water, especially in non-urban regions. In technical air filters the functionalised paper products can reduce air pollution caused by organic particulate matter (e.g. carbon black) and gaseous organic harmful substances.

Compared with conventionally used techniques, the photo catalytic active paper products have the following benefits: The photo catalyst will not be exhausted during the photo oxidation processes, so that this technology is cost-efficient. No toxic agents are necessary for the process and it is not extensive to be controlled. No special trained personal is necessary to use the materials. And no mud cake, sewage sludge or contaminated adsorbent materials have to be regenerated or depoluted.

**Period of time: 01.05.2011 – 30.06.2013**

**Remarks**

The research project IK-MF 110020 is being funded by the German Federal Ministry of Economics and Technology (BMWV).