

Photocatalysis as a New Environmental Application of Fine Ceramics: Performance and Evaluation

Koji Takeuchi^{*}, Tsutomu Hirakawa and Taizo Sano

National Institute of Advanced Industrial Science and Technology (AIST)

Tsukuba, Ibaraki 305-8561, Japan

**takeuchi-koji@aist.go.jp*

Keywords: photocatalysis, test method, standardization, ISO

Some metal oxides like titanium dioxide (TiO₂) are activated by the sun or indoor light to form active oxygen species that cause decomposition of environmental and biological pollutants. This semiconductor photocatalysis has been expected to be a new fine ceramic industry through composites, coatings and other surface treatment. Practical materials contain photocatalyst either in the substrate or on the substrate as a thin film. The substrate can be ceramic, glass, metal, plastic or paper.

The major functions of environmental photocatalysis are air and water purification, antimicrobial, and self-cleaning effects, under mild conditions without requiring additional energy. These functions have never been obtained by any other material. However, the performance is not always visible, and there have been low quality products in the market. We have started the standardization of test methods a decade ago, in order to promote the development of more efficient materials, to remove fake materials from the market, and eventually to protect consumers. The domestic standardization committee in Japan consists of leading members from academy, industry, government and users. International standardization has been discussed in ISO/TC 206 (Fine Ceramics). Then our activity shifted towards the test methods for the photocatalysts that work under indoor lighting environment (ILE), in order to respond to the indoor environmental issues,

Since most of the test methods have been standardized internationally, now we need accredited testing laboratories, performance criteria of products, certification and labelling systems, in order to disseminate reliable products. The Photocatalysis Industry Association of Japan (PIAJ) copes with preparing these systems. About 100 photocatalytic products are now certified and the sales of products are gradually increasing in Japan. We hope such systems to be expanded into Asia and world level with the cooperation of all the sectors in photocatalysis community.