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Fine ceramics (advanced ceramics, advanced technical ceramics) — Test method for self-cleaning performance of semiconducting photocatalytic materials — Measurement of water contact angle

Céramiques techniques — Méthode d'essai de la performance auto nettoyante des matériaux photocatalytiques semiconducteurs — Mesurage de l'angle de contact de l'eau

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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 27448 was prepared by Technical Committee ISO/TC 206, *Fine ceramics*.

Introduction

Under the illumination of ultraviolet (UV) light, photocatalysts show diverse functions, such as the decomposition of air and water contaminants, as well as deodorization, self-cleaning, antifogging and antibacterial actions. These functions of photocatalysts are generally based on the action of active oxygen species such as hydroxyl (OH) radicals formed on the surface of photocatalysts. The energy- and labour-saving nature of photocatalysis has attracted keen interest when the photocatalyst is activated by sunlight (or artificial lighting).

Practical applications of photocatalysts, for both indoor and outdoor use, have rapidly expanded in recent years. Many kinds of photocatalytic materials have been proposed or are already commercialized, based on ceramics, glass, concrete, plastics, paper, etc. Such materials are produced by either coating or mixing of a photocatalyst, in most cases, titanium dioxide (TiO_2).

However, the effect of photocatalysis is not easily inspected visually, and no appropriate and official evaluation methods have been available to date. Some confusion has thus arisen as photocatalytic products have been introduced. Furthermore, the above-mentioned diverse functions of photocatalysts cannot be evaluated with a single method; thus, different evaluation methods are provided for self-cleaning, water decontamination, air purification and anti-bacterial actions, respectively.

As a result of continuing efforts to provide test methods for photocatalytic materials, this International Standard (covering the measurement of the water contact angle) for self-cleaning performance was prepared. For permeable, rough, or highly hydrophobic surfaces, etc., other test methods are required and are being developed.

It must be noted that self-cleaning performance could be evaluated with photo-induced hydrophylic property and photocatalytic decomposition ability, because many field test results concerning the self-cleaning properties of TiO_2-coated materials are in good agreement with the indexes obtained by measurement of the water contact angle and degradation of methylene blue.