Photocatalytic Functional Ceramic and Its Speciality of Photodecomposition

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Abstract: Photocatalytic ceramic was prepared by coating photocatalytic membrane on ceramic matrix. The photocatalytic behavior of the TiO₂ coated ceramic for degradation of oleic acid, ethylene, SO₂, NO₂ and sterilization was studied by using XRD, chromatogram, in-situ IR and spectrophotometer. The results showed that the photocatalytic ceramic prepared by special conditions have the function of environmental conservation such as the photodegrading organic contaminants, removing inorganic baleful gas and killing bacteria. Degradation ratio of ethylene, oleic acid, SO₂ and NO₂ reached 95% - 100% respectively for the photocatalytic functional ceramic.

Key Words: photocatalysis; ceramic; degradation
1.2

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0.1 g L-

253.7 nm

2 m W/cm²

L-

2.1

100 % C, O, H, N, S, N, O, S

TiO₂

( e⁻) + \[ \text{OH}^- + \text{O}_2 \rightarrow 2 \text{OH}^+ \]

95 % 39 %

60 min

C–H

250 cm⁻¹

1750 cm⁻¹

NH³⁺, C–O, COOH, C–S

Fig.1 FT-IR spectra of L-cystine before (a) and after (b) irradiation.
2.3

Fig. 3 FT-IR spectra of the tile before and after irradiation
(a) Before irradiation for ordinary tile, (b) After irradiation for 60 min for ordinary tile, (c) Before irradiation for photocatalytic tile, (d) After irradiation for 60 min for photocatalytic tile.

Fig. 2 Variation of ethene concentration as a function of irradiation time.

Fig. 4 Correlation between irradiation time and amount of oleic acid.

Fig. 5 Removing harmful gas for photocatalytic tile.


