

Natural silicate-TiO₂ hybrids for photocatalytic oxidation of formaldehyde in gas phase

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© 2016 Elsevier B.V. Structured hybrid materials based on the combination adsorbent-photocatalyst with optimal mechanical resistance and reduced cost, are prepared by extrusion using four different natural silicates with similar mesoporous distribution: sepiolite (S), bentonite (B), mordenite (M) and kaolinite (K). The effect of the textural, morphological and structural properties of plate shaped composites calcined at different temperatures on the adsorption and photocatalytic degradation of formaldehyde in gas phase is analyzed. Silicates allows TiO₂ extrusion into flat plates with a content of 50 wt% of titania. All shaped materials present adequate mechanical resistance to be scaled-up for use in continuous-flow gas-phase catalytic reactors. Thermal treatment at 500 °C ensures an optimum combination of mechanical, textural and HCHO adsorption properties. The silicates cover part of the TiO₂ particles thus reducing the fraction of TiO₂ actually exposed on the surface of the compositi