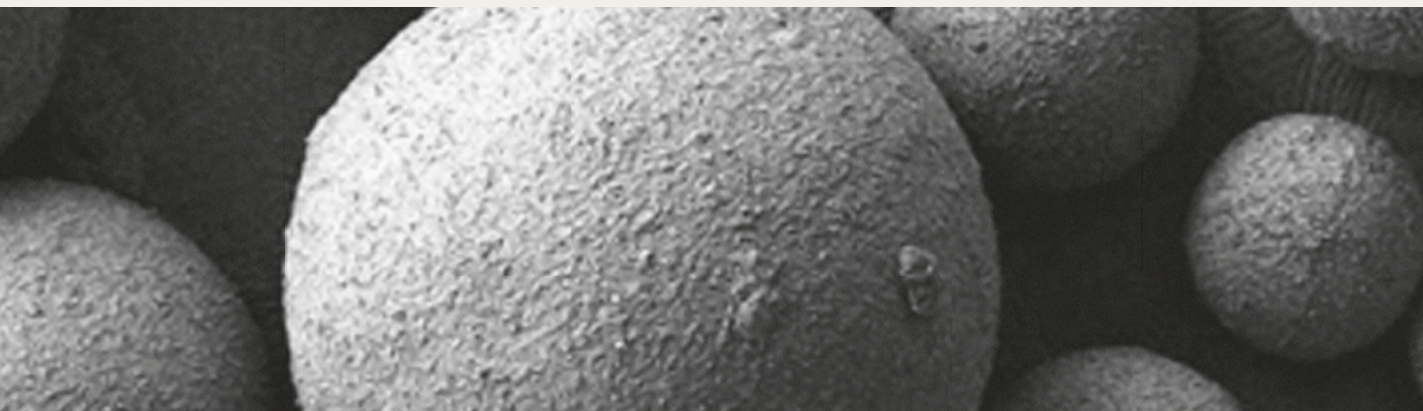


Catalyst Carrier

Newsletter

Issue 06 / 2012

New AEROPERL® Fumed Titania Granulates



Please come by and visit the Evonik booth at the upcoming 15th International Congress on Catalysis in Munich

Introduction

The previous Catalyst Carrier Newsletter (issue # 5) informed about a new measurement method to evaluate the mechanical strength of granulates. With this newsletter, we would like to introduce a newly developed granular type of fumed titania with improved mechanical stability.

Fumed titania in catalyst applications

Due to its chemical stability and inertness in many reaction media titania nowadays is valued in a number of catalytic applications. In some cases it is even part of the catalytically active composition itself, e.g. due to strong metal support interaction (SMSI) effects. Where titania is used, chemical purity and a high surface area are important. This makes Evonik's fumed titania grades AEROXIDE® TiO₂ P 25 and AEROXIDE® TiO₂ P 90 especially suitable. They are chemically very pure; in particular – due to the fumed production process – they do not contain any sulfate impurities and exhibit a high and easily accessible surface area. The phase structure consists predominantly of anatase, with a minor content of rutile. In order to

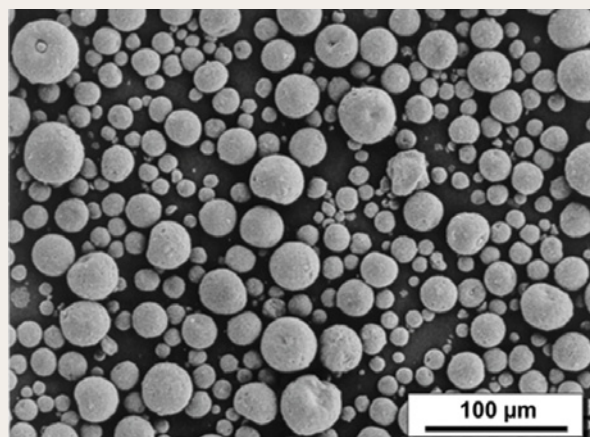


Figure 1: SEM picture of VP AEROPERL® P 25/20

ease handling of the fluffy fumed metal oxides Evonik has developed several granular grades under the brand AEROPERL® Fumed Metal Oxide Granulates. The granulated version of AEROXIDE® TiO₂ P 25 e.g. is named VP AEROPERL® P 25/20. We previously described in general AEROPERL® Fumed Metal Oxide Granulates in Newsletter # 3.

Mechanically more stable grades of AEROPERL® fumed titania

In some applications such as slurry processes a higher mechanical durability of the granulated fumed titania is required. We addressed this need and developed a new experimental grade VP AEROPERL® TiO₂ P 25 H 6, which shows a considerably better mechanical strength, while keeping the high surface area. The

following table lists some physico-chemical properties of VP AEROPERL® TiO₂ P 25 H 6 compared to VP AEROPERL® P 25/20. Moreover, with our technology we are able to further customize its product properties, if required.

Comparison of some physico-chemical data of VP AEROPERL® P 25/20 with VP AEROPERL® TiO₂ P 25 H 6

	Particle size (d50, laser diffraction) [µm]	BET surface area [m ² /g]	Pore volume N ₂ Desorption (10 – 100 nm) [ml/g]
VP AEROPERL® P 25/20	35	55	1.25
VP AEROPERL® TiO ₂ P 25 H 6	28	50	1.25

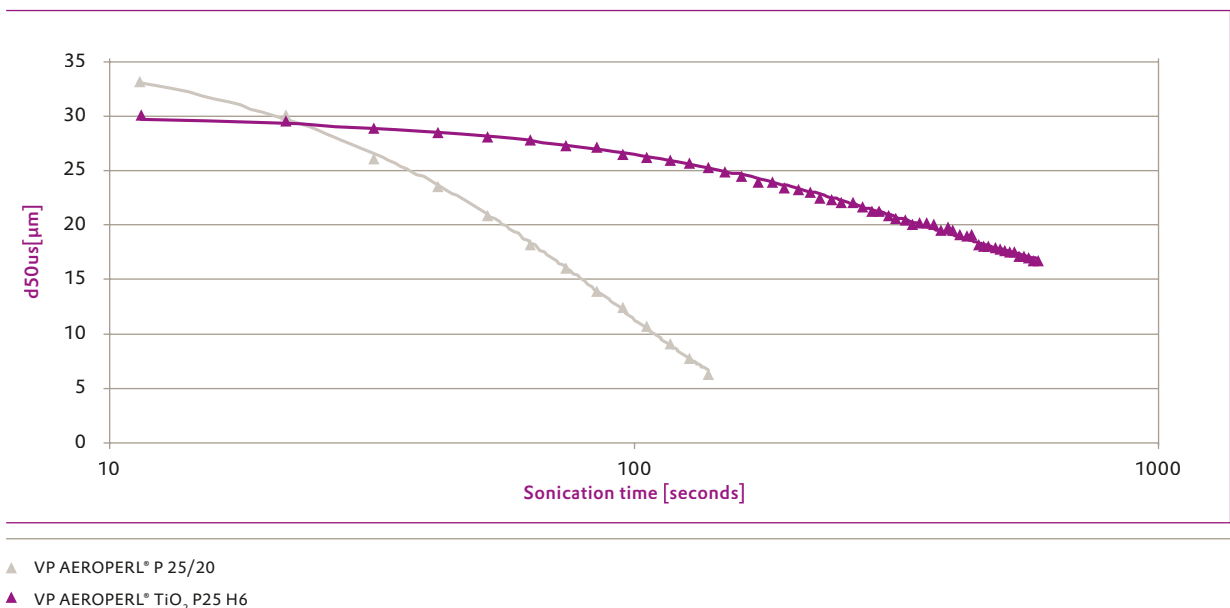
The data in this table represent typical values and are not part of the specification

To evaluate the mechanical strength of VP AEROPERL® TiO₂ P 25 H 6, the material was dispersed in water. The dispersion unit is equipped to apply a defined stress on the granulates by ultrasonic energy. Next, the stressed granulates pass a laser diffraction device to measure the particle size. Finally the dispersion is guided back to the dispersion unit. As a result of the progressive sonication, particle degradation can be observed. The reduction of the d50 value will be detected at defined time intervals. The d50 values are plotted and can be used to describe the mechanical stability of the granulates. When comparing the newly developed VP AEROPERL® TiO₂ P 25

H 6 with the regular VP AEROPERL® P 25/20 (Figure 2) one can clearly see the improved mechanical stability. While for the regular grade VP AEROPERL® P 25/20 the d50 value is reduced by 50% after ca. 65 seconds, the newly developed grade is almost unaffected after the same time. Even after more than 500 seconds ultrasonic treatment (max. of the test series) the d50 is still at ca. 60% of the initial value.

We will be happy to provide you with a sample of VP AEROPERL® TiO₂ P 25 H 6 or to go into further customizing based on your needs. Please contact us.

Figure 2: Particle size under ultrasonic treatment (d50, laser diffraction) of the mechanically improved VP AEROPERL® TiO₂ P 25 H 6 compared to regular VP AEROPERL® P 25/20. Please note the logarithmic scale on the x-axis.



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