

Particle Size Analysis of Alumina

Introduction

Alumina (aluminum oxide, Al_2O_3) has widespread use in the ceramics industry for refractory materials, abrasives, and porcelain. Many different sizes and chemically modified grades are available. Particle size affects the manufacturing and mechanical properties of these components, including packing density and mechanical strength of the final part. These materials are usually dispersed in water for measurement, with surfactant added to prevent agglomeration.

Analytical Test Method

Refractive Index (particle): 2.66

Dispersant fluid: Water, 0.1% Igepal 630 surfactant

Sonication: 15 minutes, power 4

Circulation speed: 3

Agitation speed: 1, continuous

Notes: Pre-dispersion with concentrated surfactant may be necessary to wet the particle surface before adding to the dispersion fluid.

Example data

File Name: 6472B

Median: 0.300 μm

Mean: 1.481 μm

S. D.: 4.950 μm

D(10%): 0.194 μm

D(90%): 0.643 μm

Results

Microscopic examination confirmed the presence of the large particles above 1 micron. These were hard agglomerates that could not be dispersed, even with extended ultrasonic treatment. The sensitivity of the LA-960 was useful in identifying a processing problem that created these unwanted particles.

