Paper Titles

Testing Micro- and Nanoparticles in a Dynamic Environment

Abstract:

The paper presents a study of the behavior of particles of different sizes in a medium, focusing on their settling rate, hardness and elastic modulus. The settling rate was calculated using Stokes' law, which shows a quadratic dependence on the particle radius. The results demonstrate that particles with a diameter of 100 μm settle significantly faster compared to smaller particles (1 μm and 10 μm), while the latter remain suspended for a long time due to the significant influence of viscosity. Mechanical properties of particles, such as hardness and elastic modulus, exhibit size dependence: hardness decreases with decreasing particle size, making smaller particles more vulnerable to mechanical stress. The elastic modulus shows a weak decrease for small particles, which may affect their resistance to deformation during collisions. The results obtained are important for the practical use of particles in various technological processes, such as liquid purification, development of nanomaterials, transport of solid particles in liquid or gas flows. The study emphasizes the need to consider the relationships between the physical, mechanical and dynamic characteristics of particles for optimizing technological processes and developing new materials.

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* - Corresponding Author

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