

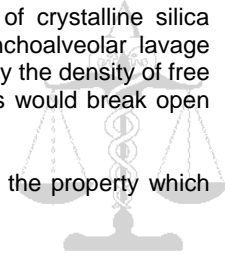
DB Warheit et al. Toxicological Sciences (2007) Vol. 95(1) p 270 – 280

Pulmonary Bioassay Studies with Nanoscale and Fine-Quartz Particles in Rats: Toxicity is Not Dependent upon Particle Size but on Surface Characteristics

Early theories about the toxicity of nanoparticles include dependency on surface area, particle size and surface activity. In this case, surface activity [a measure of the ionic state of the surface] was the key variable in relation to lung inflammation.

This was a systematic study of the effects of well characterised nano particles of crystalline silica instilled into rat lungs using saline solution. Outcomes were determined by bronchoalveolar lavage tested for signs of inflammation and by lung biopsy. Surface activity was measured by the density of free electrons. Haemolytic potential was measured by the degree to which the particles would break open red blood cells in solution.

Haemolytic potential and surface activity (possibly measuring the same thing) was the property which was most highly correlated with degree of inflammation.



Comment

There is no theory which would require that surface activity should always be the key parameter in inflammation toxicology, it seems likely that surface area and size would be important for other materials.
