



Avoiding Contamination

Abstract

Describes how electroacoustic procedures like that used in the AcoustoSizer overcome the problem of contamination by avoiding the need for sample dilution.

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1 Introduction

One of the most useful aspects of the electroacoustic method is that it can be used to make accurate measurements of both the size and the zeta potential of a colloidal suspension without the need for dilution.

The more usual methods of surface characterization employ either sedimentation or a light scattering technique, and in both cases the result is severely compromised if the suspension is at all concentrated. Indeed, for light scattering methods it may be necessary to dilute a sample by many orders of magnitude before it is sufficiently transparent to give reliable results.

For samples of solid particulate matter, the dilution does not normally cause a significant change in the particle size. It will, however, almost certainly alter the zeta potential since this depends on the equilibria which are established between the solution and the surface of the particles. One of the main problems with dilution is the possibility of contamination of the surface, due to the fact that there is so little surface area available, so any surface active contaminant, will cause a significant effect.

2 Example of Latex Contamination

Normally one would consider that storage of a sample in a clean glass container would be a reasonable procedure. But Figure 1 shows some results of a careful series of experiments by Furlong *et al.* [*J. Colloid Interface Sci.* **80**, 20 (1981)] using a well-characterized latex dispersion. They stored the latex at two different particle concentrations, corresponding to a surface area of 0.1 and 1 m² per litre in a clean borosilicate glass container.

At the higher concentration the effect is not very obvious and is similar in the glass and a plastic container. The behavior of the dilute sample is, however, very much different, and one can see that the surface is very significantly affected, almost certainly by silica or silicate adsorption.

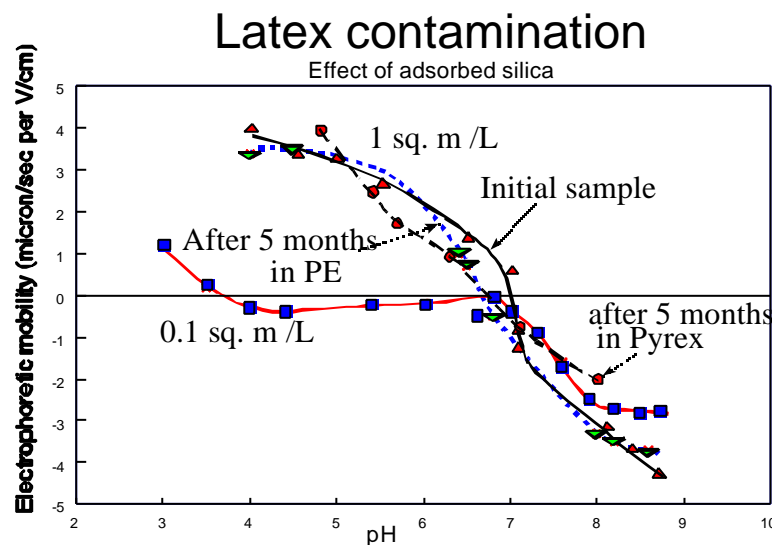


FIGURE 1: EFFECT OF ADSORBED SILICA

3 Using the AcoustoSizer to Avoid Contamination

In other cases, one may introduce contaminants from the atmosphere or in the wash water or equilibration solutions. When dilution of the sample is a necessary precursor to any analytical procedure, it means that one can *never* be sure that the result is characteristic of the initial material and is not simply an artifact.

Electroacoustic procedures like that used in the AcoustoSizer overcome the problem of contamination by avoiding the need for sample dilution. The solid surface area is always so large that any contaminant is spread too thinly to be noticed.