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Development Of A New Sedimentation Potential Measuring Device For Silica Suspensions In Various Dispersion Media

D.Narsia[1]

[1]Georgian Technical University, Faculty of Chemical Technology and Metallurgy, Department of Chemistry
Corresponding Author: D.Narsia[1]

Abstract: This study presents a new device designed to measure the sedimentation potential in silica suspensions. The device represents a significant advance in sedimentation analysis techniques [1]. This device is being used for the first time, which will significantly improve the understanding of sedimentation dynamics and measurement accuracy in suspensions of hydroxides, acids, and salts.

Keywords: New Sedimentation Potential, Measuring Device, Silica Suspensions, Dispersion Media.

Introduction

The sedimentation potential is an important parameter for particle sensing in suspensions [2,3]. This property is widely used to study various compounds, including silica (SiO2). Although traditional methods often fail to capture real-time sedimentation dynamics [4], in this study we propose a unique approach based on a specially designed column that measures sedimentation potential with high accuracy [5]. This device is characterized not only by its design, but also by its application in hydroxides, acids, and salts.

Experimental setup

The column used in this study was made of dried aquarium glass with a thickness of 10 mm. The column had a height of 40 cm and a rectangular parallelepiped shape with three transparent holes on its surface for the placement of platinum electrodes (Fig. 1).

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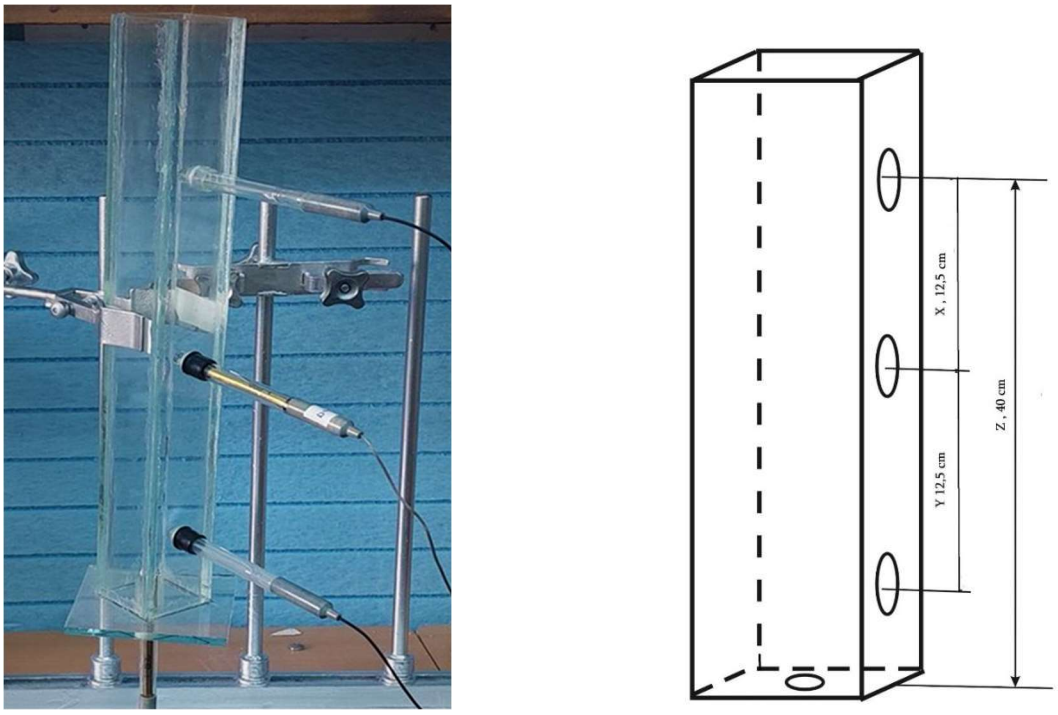

Fig. 1. Device where the sedimentation process takes place.

1. Electrode placement:

• X electrode: placed 7 cm from the top of the column.

• Y electrode: placed 12.5 cm below the X electrode.

• Z electrode: Located 12.5 cm below the Y electrode, at the bottom of the column.

• F electrode: Located at the bottom of the column, approximately 33 cm from the X electrode, to measure the potential in the sediment (Fig. 2).

2. Electrical configuration:

• X - Y

• X - Z

• X - F

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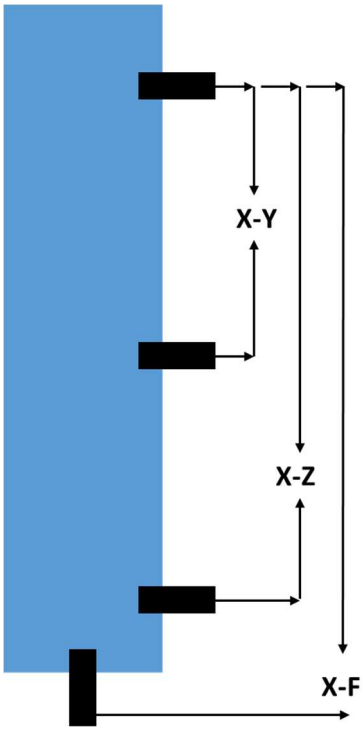

Fig. 2. Electrode placement

3. Signal acquisition:

The signals were acquired by three Axio AX18B multimeters connected to the electrodes. The data were processed by a computer system that took approximately 3000 readings for each electrode [6].

Data and discussion

The use of the constructed column has provided us with important knowledge about the sedimentation potential in silica suspensions. The unique electrode arrangement and signal acquisition system allow us to study in detail the potential changes during the sedimentation process [7]. This has led us to a deeper understanding of the sedimentation dynamics of hydroxides, acids, and salts as a solute medium, where the interaction of particles and the propagating agent significantly alters the rate and nature of sedimentation [8,9].

Conclusion

This study presents a new device for measuring the sedimentation potential, which has not been previously used in sedimentation studies. A specially designed column, with platinum electrodes and Axio AX18B multimeters, allows us to accurately and in detail characterize the sedimentation dynamics in silica suspensions. The successful use of this device may facilitate further studies that will provide a broad understanding of particle motion and interaction in various solute mediums [2,10].

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