

Pretreatment Process of Brackish Water

Tongzhou Wang

Ruddy Argueta

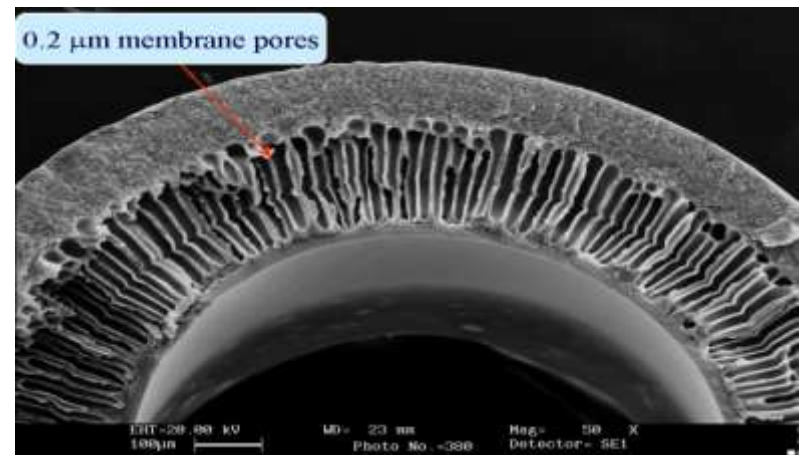
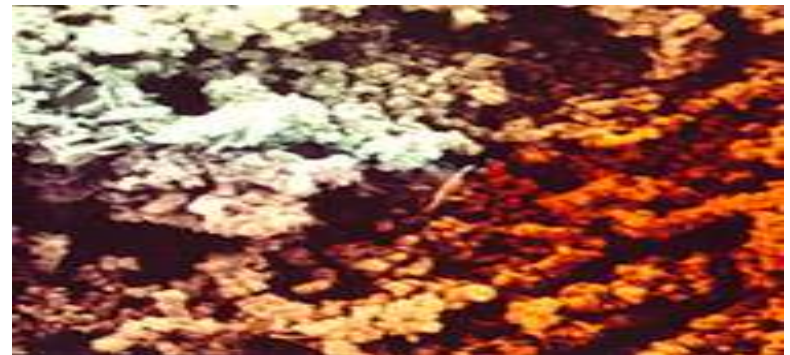
Ricardo Torres

Matthew Graham

RO and Brackish water

Challenge: silica removal

- Scaling occurs on membranes
- 100 ppm concentration of silica.
- Desalination can only remove ~75% of the water before scaling.



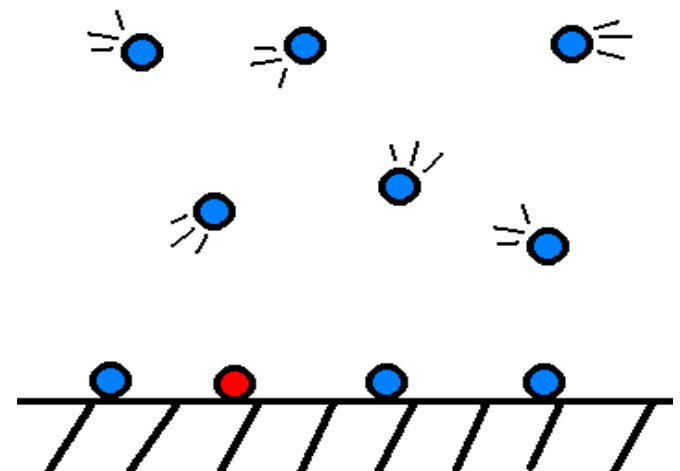
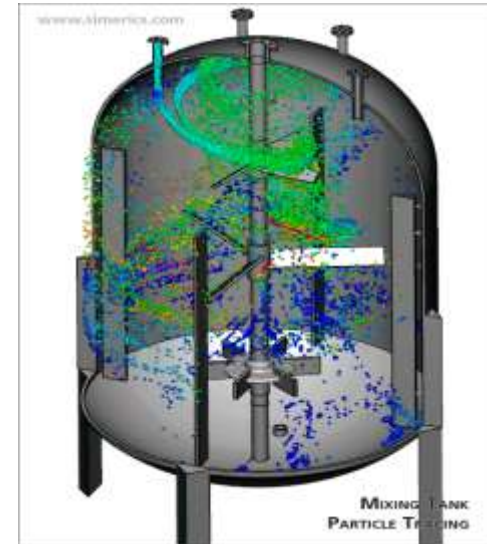
Objective

- Silica removal from brackish water prior to desalination as a part of a pre-treatment process.
- Silica content of the brackish water can be reduced up to 90%, which indicates that there will be a significant improvement of the life span of the RO membrane.

Methods

- Coagulant method
 - Calcium hydroxide

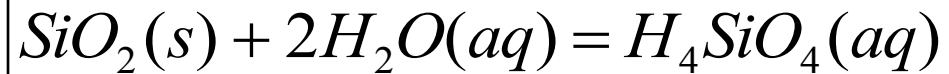
- Adsorbent method
 - Activated alumina (AA)



Coagulant Method

Silica chemistry

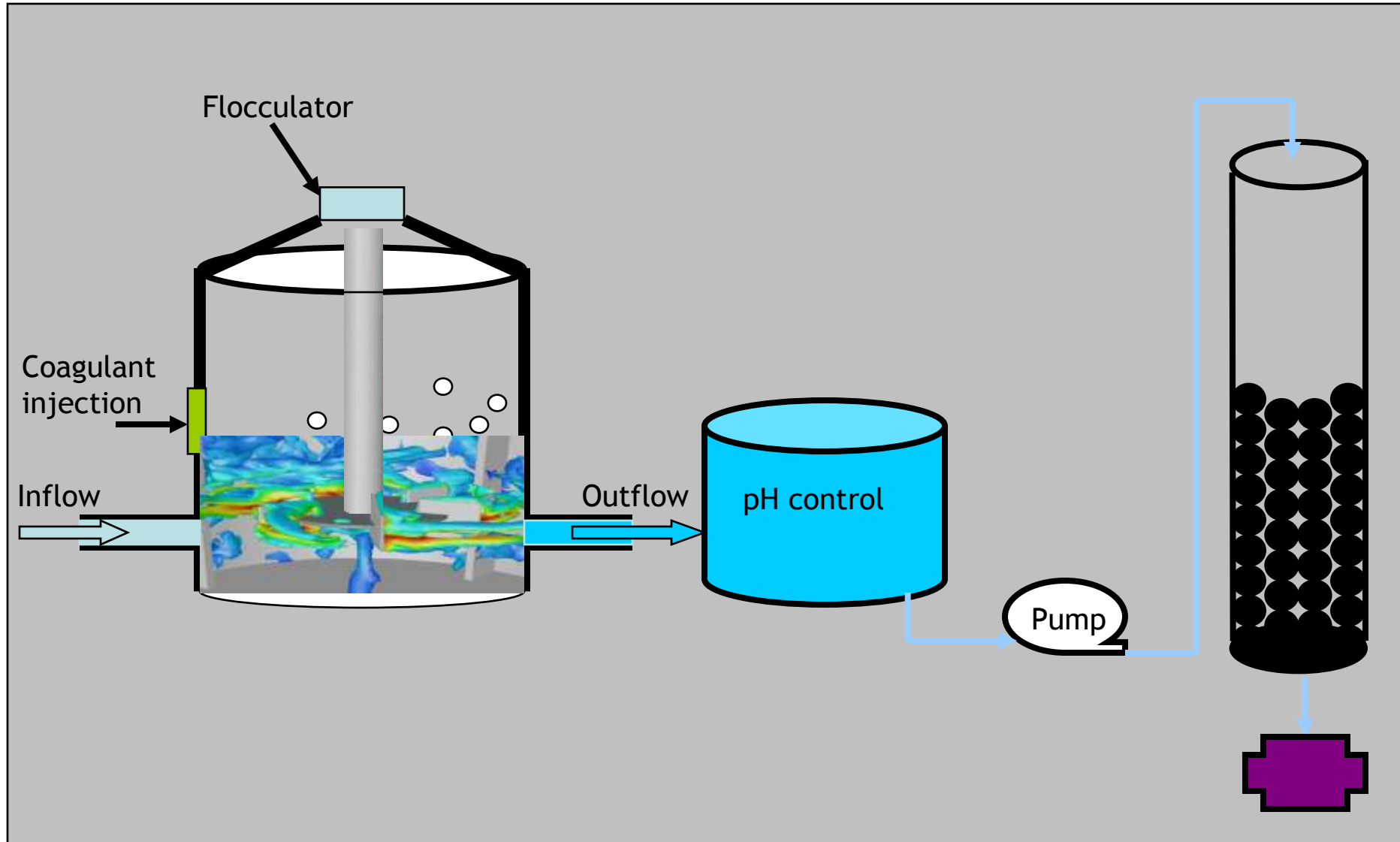
Silica Dioxide with Water



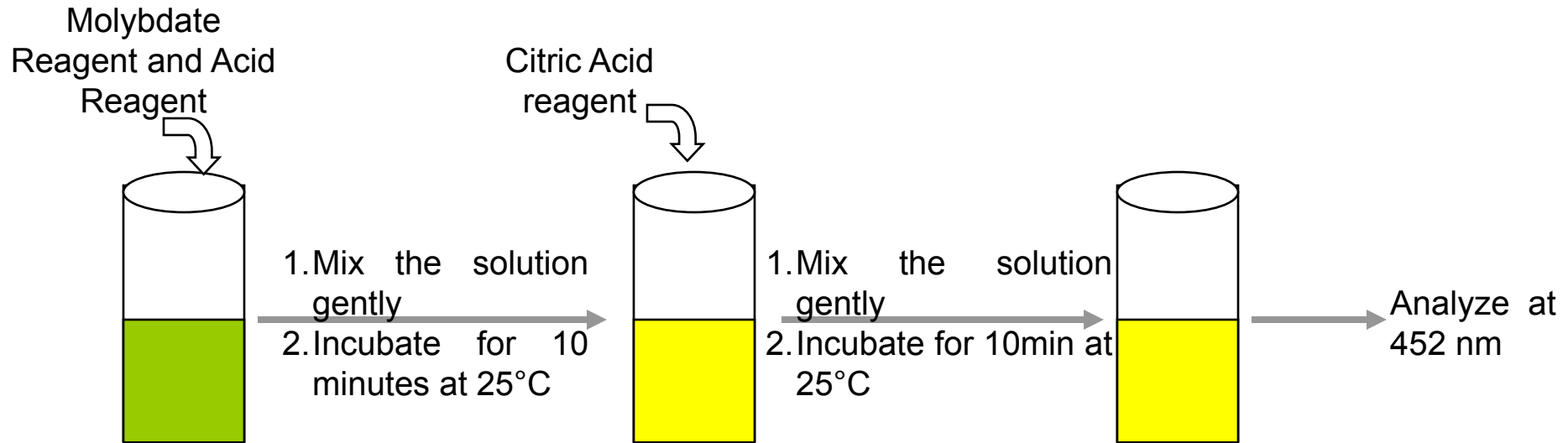
Calcium Hydroxide reactions with Silicic Acid



Proposed Method



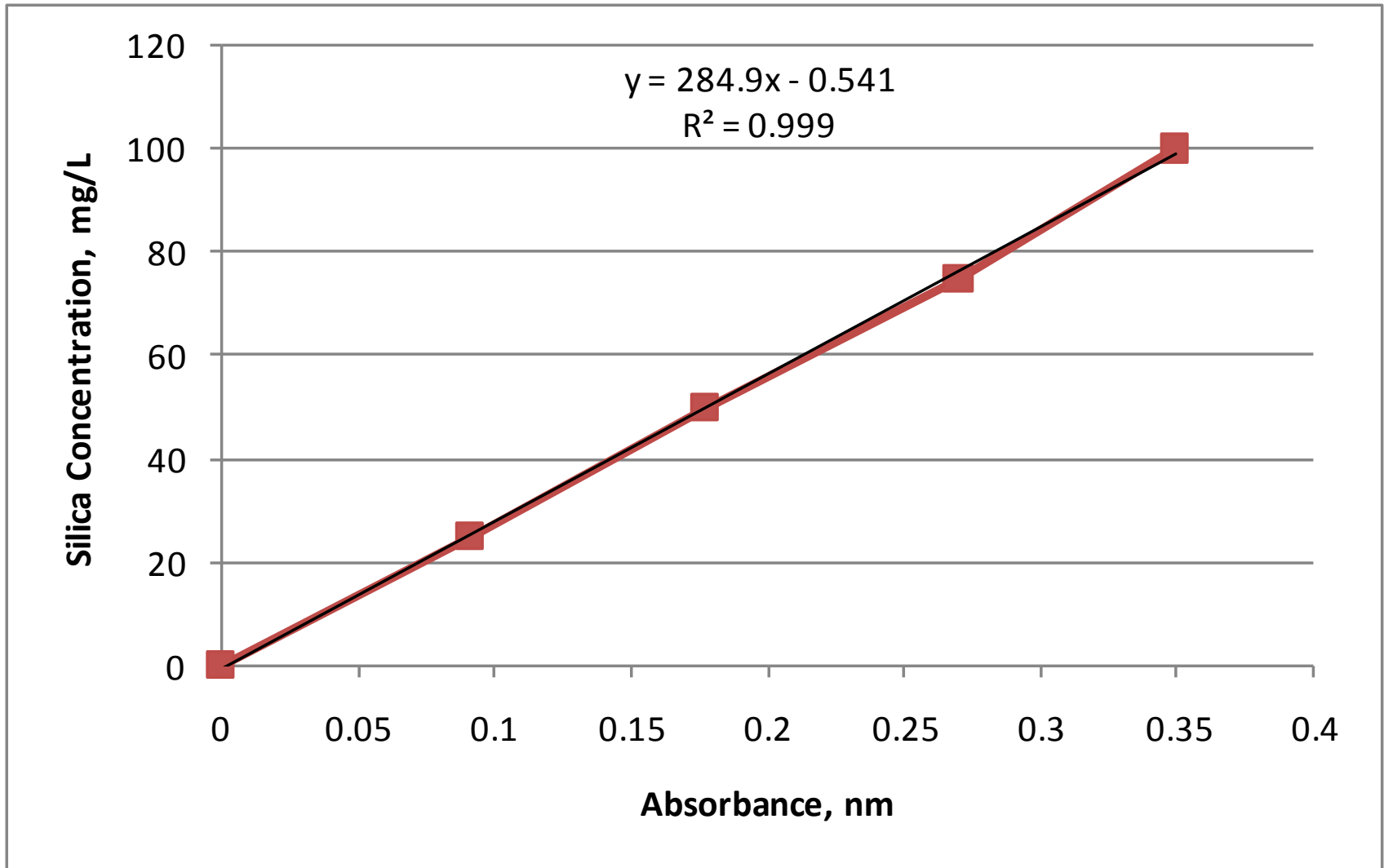
Method of Analysis



$$\frac{Silica_{initial} - Silica_{final}}{Silica_{initial}} \times 100 = \%Silica_{removal}$$

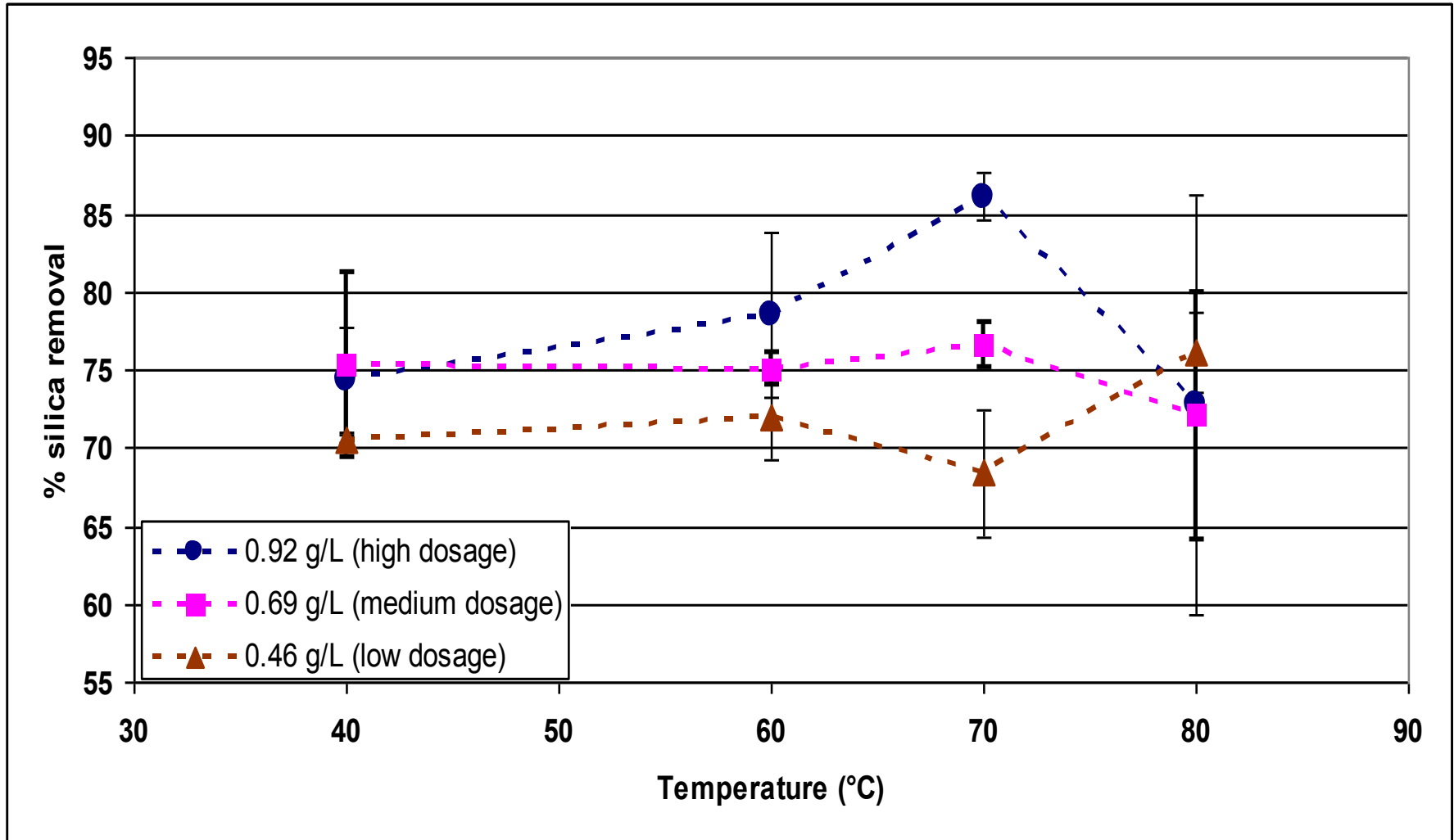


Standard Curve

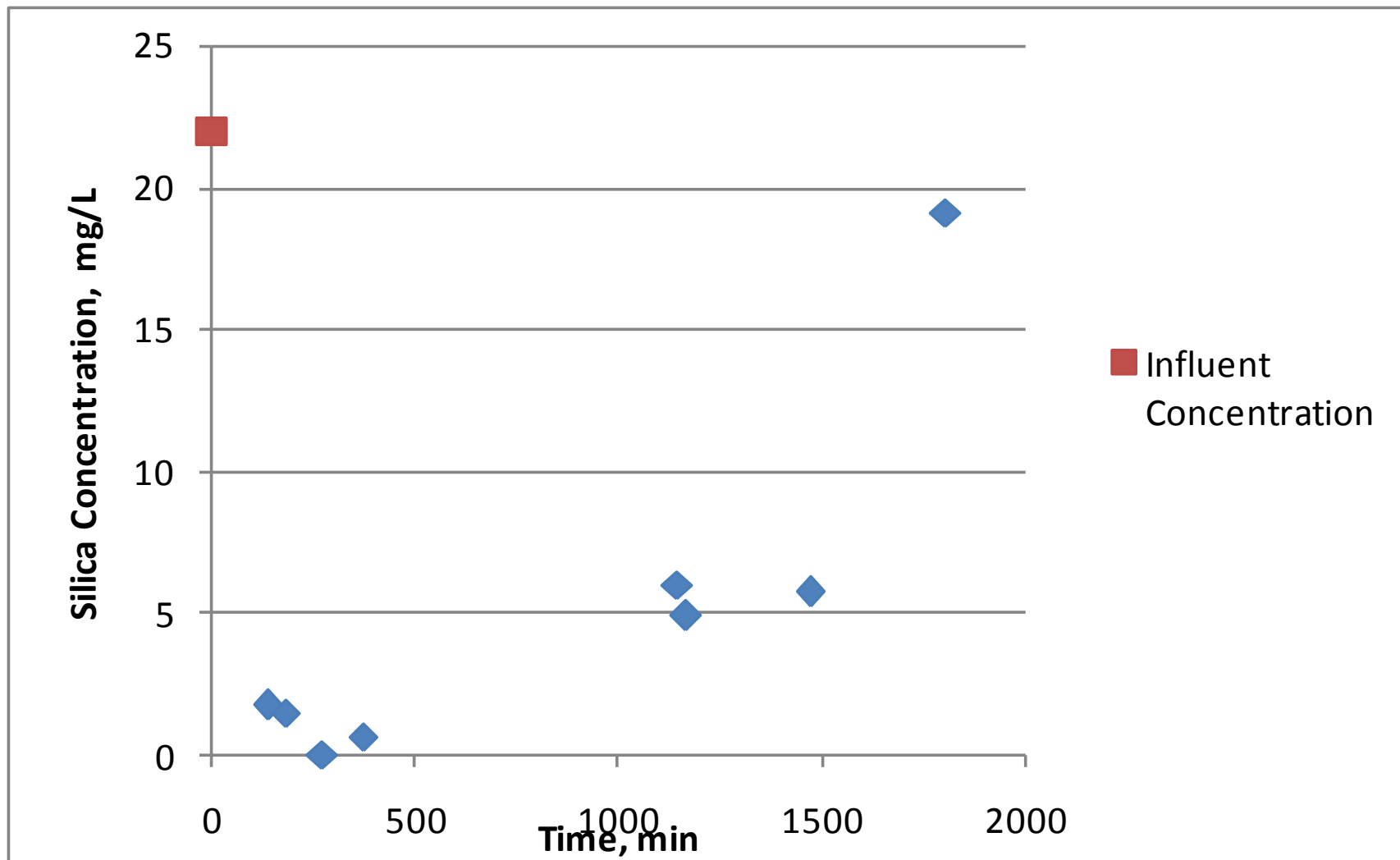


Silica efficiency

The effect of temperature on percentage silica removal



Silica Removal: Activated Alumina



Thank you.